Investigations in the Upper White River Drainage: The Albee Phase and Late Woodland/Prehistoric Settlement

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Archaeological Resources Management Service
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Analysis of samples of the floral and faunal material was expertly conducted. Leslie Bush provided another stellar report for us. It is always a pleasure. We gained a new friend and archaeozoologist in Tanya Peres. Alison Hadley and Tanya provided a wonderful report from the faunal samples. Thank you ladies.

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ABSTRACT

The Archaeological Resources Management Service conducted a FY2004 Historical Preservation Fund Grant to deconstruct and redefine the Albee Phase. The project involved the systematic survey of agricultural land within the White River Valley in Hamilton County, limited testing of site 12-H-993 and a review of previously collected information concerning the Albee Phase. The archaeological survey documented 40 new and 8 previously recorded sites and recovered over 1200 artifacts. Diagnostic artifacts ranged in age from the Middle/Late Archaic (3700 BC) to the Historic (late 20th century) period. The dominant occupation of the White River floodplain was from the Late Woodland/Prehistoric period. The test excavations at site 12-H-993 provided a wealth of information on the Late Woodland/Prehistoric era. Thirteen features were encountered during the testing and nine were excavated. The Albee Phase occupation was very minor and only a few artifacts could be definitively related to this phase. Radiocarbon dates place the occupation between AD 1030 and 1420 (2-sigma calibration). In spite of the paucity of new information concerning the Albee Phase derived from the survey and testing portion of this project, problems in defining the Albee Phase in terms of geographic extent, artifacts, chronology, and relationships to other archaeological manifestations were addressed. In addition, data from 12-H-993 allowed for a brief review of the nature of the Oliver Phase. The dominant occupation contained Bowen series ceramics (Dorwin 1971), one of the two ceramic traditions considered to be part of the Oliver Phase (Dorwin 1971; McCullough 1991, 2000). The lack of Oliver series ceramics (Helman 1950), a Fort Ancient style, from this site raised questions about the current characterization of the Oliver Phase. Current perceptions of the nature of the Albee and Oliver phases were reviewed and suggestions for future research were proposed.

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1.0 INTRODUCTION

The Archaeological Resources Management Service (ARMS) at Ball State University conducted a FY2004 Historic Preservation Fund Grant to deconstruct and redefine the Albee Phase. The project was contained within the Upper White River drainage basin defined as that area of Indiana drained by the upper reaches of the West Fork of the White River above the Marion/Hamilton county line (Figure 1). This region was selected for a number of reasons. First, the area is seriously threatened by urban sprawl and gravel mining, particularly in the river valleys where Albee Phase sites are most likely to occur. Second, we had an intimate familiarity with this region from many years of prior research. Also, we know that Albee Phase data is present within this region which has not been previously synthesized which will allow us to reach the goals of the project. Third, the West Fork of the White River has been identified as a cultural boundary associated with several archaeological cultures (Dorwin 1971, McCullough 2000, McCord and Cochran 2003a). Defining the Albee Phase within this boundary area will have direct relevance to and impact upon further definition of the Albee Phase in surrounding regions

For this project several information sources were explored and a variety of methods were employed. Systematic pedestrian surveys of 195 acres were conducted for three agricultural properties in Hamilton County within the Upper White River drainage. Survey was conducted within the river valley, since Albee Phase settlement was predicted in the valley. While we know that the valley of the White River is complex and variable, we hoped to offer a characterization of prehistoric utilization of the floodplain.

Limited testing of site 12-H-993 was also undertaken. The site is multicomponent and diagnostic artifacts from the Late Archaic, Middle Woodland, Late Woodland/Prehistoric and Historic periods were recovered. Pottery recovered from the surface was related to the Albee and Oliver Phases (McCord and Cochran 2003a). A geoarchaeological survey of a portion of Koteewi Park by the Indiana State University Anthropology encountered two Late Woodland/Prehistoric pit features within site 12-H-993 (Cantin et al. 2003). The features contained pottery, lithics, faunal and floral remains. A radiocarbon date of 630 +/- 60 BP was obtained from one of the features (Cantin et al. 2003). Portions of site 12-H-993 were within an area proposed for the development of a recreational lake by Hamilton County Parks and were considered threatened. Since part of this site was threatened, Albee ceramics were collected from the surface, and the site had the potential to contain sub-plowzone cultural deposits, it was selected for test excavations. The goal of the testing was to obtain information from an Albee Phase habitation to examine chronology, relationships to other archaeological units, and settlement pattern/settlement systems. The dominant component of the site, however, was not Albee. The features, artifacts, floral and faunal material were assessed in relation to Late Woodland/Prehistoric archaeological units from the region. The material recovered from the site is associated with Bowen series ceramics (Dorwin 1971). These ceramics have been characterized as one of the two ceramic traditions considered to be part of the Oliver Phase (Dorwin 1971; McCullough 1991, 2000). The lack of

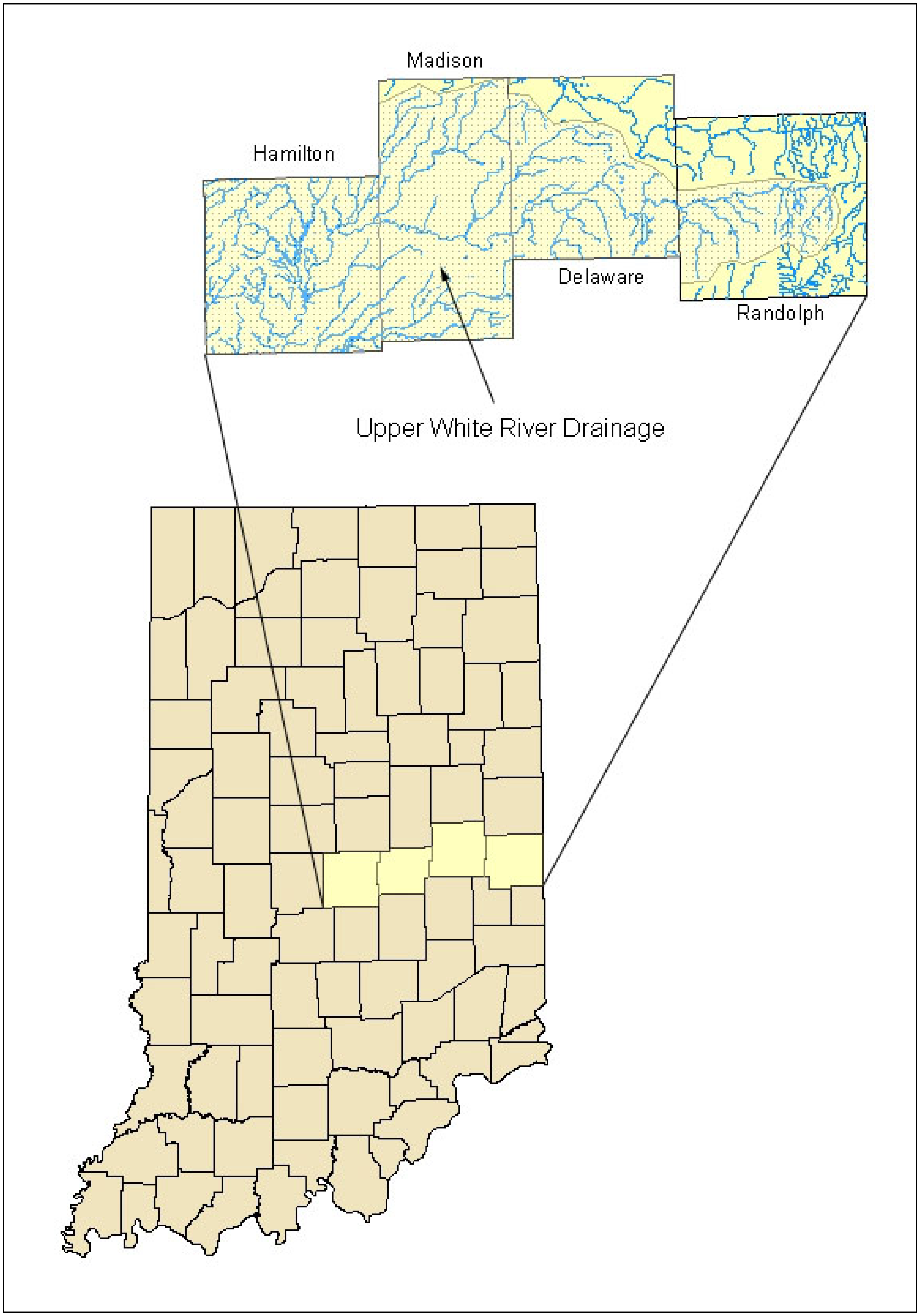

Figure 1. The Upper White River drainage above the Marion/Hamilton County line.

Oliver series ceramics (Helman 1950), a Fort Ancient style, from this site raises questions about the definition of the Oliver Phase as currently defined.

The final component of this project was to provide a critical evaluation of Albee Phase data that has been previously collected. We anticipated investigating Albee Phase chronology, diagnostic artifacts, settlement, and relationships to other central Indiana archaeological units. To structure the investigations of the Albee Phase as proposed, a number of research questions were developed as guides:

1. What are the chronological limits of the Albee Phase in the Upper White River drainage?

2. What are the diagnostic artifacts of the Albee Phase in the Upper White River drainage?

3. Is there diachronic variation in the material culture of the Albee Phase?

4. What is the Albee Phase settlement pattern in the Upper White River drainage?

5. What is the relationship of the Albee Phase to other archaeological units?

6. Is there definable variation between the Albee Phase in the Upper White River drainage and other regions?

The project results had broad applications to the overall definition of the complex precontact record of Indiana. New information from both the Albee and Oliver phases was obtained. Revisions to both these phases in terms of taxonomy and nomenclature were proposed.

2.0 BACKGROUND

To provide a framework for interpreting of the data collected during this project, a review of the natural and cultural setting was undertaken. The background information presented in this report includes environmental and archaeological information concerning the Upper White River drainage and specific areas of the valley in Hamilton County.

2.1 Environmental Setting

2.1.1 Location

The Upper White River drainage basin is defined for this report as that area of Indiana drained by the upper reaches of the West Fork of the White River above the Marion/Hamilton county line (Figure 1). The drainage basin is within the east central region of Indiana and within portions of Randolph, Delaware, Madison, Hamilton, Henry, Tipton, Clinton and Boone counties. The drainage basin contains approximately 1209 square miles above the Marion and Hamilton County line (Hoggart 1975). Since the drainage basin is mainly contained within Randolph, Delaware, Madison and Hamilton counties, these counties were the focus for background research.

2.1.2 Geology

The structural framework of Indiana is divided into three general areas: the Illinois and the Michigan Basins which are separated by the Cincinnati Arch and its branches of the Findlay and Wisconsin Arches (Gutshick 1966:9). The Upper White River drainage is within the Cincinnati Arch, a broad region of uplift (Gutshick 1966:10-17). The Cincinnati Arch can be divided into smaller bedrock physiographic zones. In the Upper White River drainage, these zones are the Dearborn Upland, the Bluffton Plain and the Scottsburg Lowland (Schneider 1966:54).

The Dearborn Upland is a dissected plateau with deeply intrenched stream valleys. The zone occurs on the eastern and southern boundary of the Upper White River drainage. Some regions of the plateau are so dissected that the upland surface has been destroyed, but away from the main streams the upland remnants are preserved and may contain virtually unmodified broad plains. The limestones and shales of late Ordovician age that occur in this region are overlain with glacial drift (Wayne 1956:18, Schneider 1966:42-43).

The Bluffton Plain is a nearly flat limestone upland, but slopes closely with the regional dip on the north end of the Cincinnati Arch. The plain was formed over Silurian limestones and dolomites. The Bluffton Plain is covered by unconsolidated glacial deposits (Wayne 1956:29-30, Schneider 1966:56).

The Scottsburg Lowland is a linear belt of low relief that occurs on the western edge of the Upper White River drainage. The belt is controlled by the relatively nonresistant shales of late Devonian and early Mississippian age. This lowland is not well defined in the Upper White River drainage, since it has been obscured by overlying glacial drift (Wayne 1956:20-22, Schneider 1966:44-45).

The bedrock of the Upper White River drainage contains mainly Silurian limestone, dolomite and shale with Ordovician shale and limestone and Devonian limestone on the western edge of the basin (Gutschick 1966:5, Shurig 1974, Gefell 1983, Chen and Caturvedi 1992). Limestone bedrock is noted as outcropping along the West Fork of the White River near Clare and Strawtown, on Fall Creek above Geist Reservoir and on Stoney Creek east of Noblesville (Gefell 1983:17).

Known chert outcrops from the central Indiana region include Liston Creek, Kenneth and Attica (Cantin 1994). Limestone outcrops in the Upper White River drainage have not been systematically sampled for chert, but could contain Liston Creek or Fall Creek chert. Liston Creek chert is a component of the Liston Creek Limestone Member (Cantin 1994:25). In Randolph County, several quarries with limestone are mentioned, but no specific chert sources are reported (Cummings and Schrock 1928:171). Two quarries in Delaware County, one in Section 11 Township 20 North, Range 10 East and one in Section 20, Township 20 North, Range 6 East, are reported to contain Liston Creek limestone (Cummings and Schrock 1928:172). In Madison County in Section 25, Township 18 North, Range 6 East, a quarry along a branch of Fall Creek contains rock equivalent to beds of Liston Creek limestone (Cummings and Schrock 1928:172-173). In Hamilton County in Section 2, Township 19 North, Range 6 East an outcrop of shale along the White River is overlain by 5 or 6 six feet of Liston Creek limestone (Cummings and Schrock 1928:64-65).

A bedrock source of Fall Creek chert has recently been identified by Curtis Tomak and Cameron Quimbach (Curtis Tomak, personal communication 2004). The bedrock source is in a quarry wall on the property of the Pendleton Reformatory. Most Fall Creek chert has been identified in till and stream gravels with an apparent concentration around Strawtown in Hamilton County (Lumbis and Cochran 1984, Stephenson 1984, Hixon 1988, Cree 1991, McCord and Cochran 2001, McCord and Cochran 2003a). Although the stratigraphic association for Fall Creek chert has not been verified, Liston Creek Limestone is a likely possibility. Chert has been identified as an abundant component in the glacial till in the region (Gooding 1973:13-14.

2.1.3 Glacial History

Glacial drift from the Kansan, Illinoian and Wisconsinan glacial episodes covers the bedrock in most areas of the Upper White River drainage (Wayne 1966). The Wisconsin glaciation deposits buried the previous glacial episodes and all of the surface glacial land forms in the Upper White River drainage are part of the Cartersburg Till Member of the Trafalgar Formation (Wayne 1963, Wayne 1966:26). The Trafalgar formation is composed primarily of a massive calcareous conglomeritic mudstone, a compact but uncemented sandy, silty, matrix with scattered beds of gravel, sand and silt (Wayne 1963:45).

Unconsolidated sediments overlie the Trafalagar Formation in some areas and were deposited extraglacially as the Atherton Formation (Wayne 1963:31, Wayne 1966:26). These sediments of gravel, sand, silt and clay were derived primarily from glacial outwash and were sorted and deposited by meltwater currents, wind action or in the quiet waters of glacial lakes (Wayne 1963:31). Most of the Atherton Formation sediments in the project area would belong to the outwash facies. This facies consists of stratified coarse-grained sediments which were deposited in sheets and by glacial meltwater currents in valley fill (Wayne 1963:32). Extensive outwash deposits occur along the White River and some of its major tributaries. Areas of peat and muck were found on outwash terraces and glacial sluiceways in ridge and ground moraines.

The outwash facies of the Atherton Formation intertongues and intergrades with other formations in the state and it is disconformably overlain by the Martinsville Formation in most of the state (Wayne 1963:32). This occurs within the Upper White River drainage. The Martinsville Formation sediments are post glacial in age, composed of recent alluvium of silt, sands and gravels that only occur on the flood plains or as paludal deposits of organic matter (Wayne 1963:28-29).

2.1.4 Physiography

The Upper White River drainage lies within the Tipton Till Plain physiographic division of Indiana, a member of the Till Plain Section of the Central Lowland Province of the United States (Schermerhorn 1967:83). This gently rolling, almost featureless plain is almost entirely composed of glacial till and only slightly modified by post glacial stream erosion. The flat till plain is broken by end moraines, eskers, esker troughs and meltwater drainages (Schneider 1966:49-50).

The description of the Tipton Till Plain region has been recently revised by Gray (2000). The Tipton Till Plain is redefined as the Central Till Plain Region and subdivided into physiographic sections. The majority of the Upper White River drainage is within the New Castle Till Plains and Drainageways, but it is also on the margins of the Bluffton Till Plain and the redefined Tipton Till Plain. The New Castle Till Plains and Drainageways section is characterized as a relatively featureless plain of low relief dissected by a crisscross pattern of meltwater features. Tunnel valleys fed the West Fork of the White River, several tributaries of the East Fork of the White River and the several forks of the Whitewater River. The Bluffton Plain is dominantly a low relief till plain but includes a sequence of concentric moraines. The Tipton Till Plain is defined as a till plain with low relief with extensive areas of ice-disintegration features.

The surface topography of the Upper White River drainage varies from flat and gently undulating to broadly rolling. The areas of greatest relief occur along the White River and its main tributaries when gently rolling outwash terraces meet old glacial meltwater channels resulting in abrupt changes in elevation. The landforms present within the drainage are flood plains and terraces, ridge/end moraines, till plains, outwash plains, lacustrine plains, eskers/kames, and muck and peat depressions (Shurig 1974, Gefell 1983, Chen and Caturvedi 1992).

2.1.5 Valley Development

The valley of the west fork of White River and most river valleys in the glaciated region of Indiana were created by glacial meltwater (Cumings and Schrock 1928:27-37). As the glacial ice melted and retreated to the north, the flat till plain was inundated with water and numerous broad valleys leading southward and southwestward were created (Malott 1922:109). In northeastern Indiana, the modern major tributaries follow old sluiceway valleys that were entrenched along the front edge of each of the crescentic end moraines. The modern rivers and streams are underfit in the broad glacial sluiceways (Malott 1922:109).

The valley of the west fork of the White River at its headwaters in Randolph County is flat and poorly developed and the flood plain is narrow. The headwaters originate in the till plain and the northerly flow is influenced by elevation. Downstream between Union City and Winchester, the valley follows the south margin of the Union City moraine and the entrenched glacial sluiceway. As the flow turns to the west, the valley becomes wider and deeper and the river begins to meander. At the west edge of Muncie in Delaware County, the valley no longer follows the southern edge of the moraine, but continues west following one of the sluiceway valleys. In western Madison County the river meanders in loops one-half mile wide and the flood plain can also be as much as one-half mile wide. By the time the river reaches Strawtown in Hamilton County, the valley is almost one mile wide and the river continues to meander. At Strawtown the valley makes a sharp bend to the south. The sluiceway valley south of Strawtown is broad and the modern river and flood plain are confined to a narrower portion of the Pleistocene valley. The modern river valley and flood plain at Indianapolis and to the south can be up to 2 miles wide in the sluiceway valley that is 4 or 5 miles wide and over 75' deep (Burger et al. 1971, Gray et al. 1972, and Gray et al. 1979).

2.1.6 Soils

The majority of soils found in the Upper White River drainage are a product of either glacial or fluvial parent materials. Glacially deposited sediments of the ridge and ground moraines typically have clayey to silty textures while kames and eskers consist of sands and gravels. Glacial-fluvial deposits in outwash plains and terraces range from silty to gravelly textures. The more recent fluvial deposits found on flood plains and river terraces are dominated by loamy textures. Lacustrine plains tend to have clayey textures. The cumolose deposits of peat and muck are high in organic matter with little mineral composition (Shurig 1974, Gefell 1983, Chen and Caturvedi 1992).

Areas that were surveyed or excavated during this project were all within the Upper White River Valley in Hamilton County. The soils were a result of both glacial and fluvial parent materials and mapped in two soil associations. The Ockley-Westland-Fox soil association is characterized by deep and moderately deep soils over sand and gravel, that are nearly level to strongly sloping, well drained and very poorly drained, medium textured and moderately fine textured sediments that formed in outwash on terraces (Hosteter 1978:4). The Shoals-Genesee soil association is characterized by deep, nearly level, somewhat poorly drained and well drained, medium textured soils that formed in alluvium on flood plains (Hosteter 1978:4).

The soil phases mapped within areas investigated are presented in Table 1.

Table 1
Soils within Areas Investigated

Soil Phase	Drainage	Parent Material	Physiography	Soil Order
Ross loam (Ro)	well drained	alluvium	flood plain	Mollisol
Genesee silt loam (Ge)	well drained	alluvium	flood plain	Entisol
Shoals silt loam (Sh)	somewhat poorly drained	alluvium	flood plain	Entisol
Ockley silt loam, 0 to 2% slopes (0cA)	well drained	outwash	terrace	Alfisol
Ockley silt loam, 2 to 6% slopes, eroded (OcB2)	well drained	outwash	terrace	Alfisol
Fox clay loam, 9 to 18% slopes, severely eroded (FxC3)	well drained	outwash	terrace/upland	Alfisol
Nineveh loam, 0 to 2% slopes (NnA)	well drained	outwash	terrace	Mollisol
Fox loam, 0 to 2% slopes (FnA)	well drained	outwash	terrace/upland	Alfisol
Fox loam, 2 to 6% slopes (FnB2)	well drained	outwash	terrace/upland	Alfisol
Westland silty clay loam (We)	very poor	outwash	outwash plain	Mollisol

While the soils can be broken into two basic groups of flood plain and terrace soils, there is variation in the formation and age of the soils. The Alfisols within the project began forming after the last glaciation typically under deciduous forest vegetation (Fanning 1989:268). Alfisols form primarily from eluviation (downward movement of dissolved or suspended material within soil) and illuviation (deposition of material in an underlying soil layer leached out of an overlying soil layer) of silicate clay and iron oxides (Fanning 1989:267). The age of the Mollisols in the project is more variable; mollic epipedons have been noted to form in fewer than 900 years, but they could be as old as the last glaciation (Fanning 1989:256-257). They most likely developed in native grasslands since they have high levels of calcium humates (Fanning 1989:255-256). Mollisols form primarily from calcification or the underground decomposition of organic matter, especially grass roots, in the presence of calcium, faunal bioturbation and eluviation and illuviation (Fanning 1989:255). The Entisols within the project are likely the youngest soils, since they occur in the flood plain and form from an accumulation of alluvium (Fanning 1989:229).

The soils listed in Table 1 all had the potential to support or attract human occupation. The Shoals and Westland soils were not likely areas of habitation because of poor drainage characteristics and use as overflow channels, but they would have supported wetland vegetation and fauna that were potential food and raw material resources. The remaining soils were well drained and could have supported human habitation and a varied woodland and prairie biotic community. The Genesee and Ross soils were subject to flooding and while this may have hampered occupation, the fertile soils would have been attractive for cultivation of crops.

2.1.7 Water Resources

Water resources are extremely important to human occupation and influence human habitation. The Upper White River drainage contains a wide variety of water resources such as springs, wetlands, small intermittent streams, year round flowing streams, seasonally flowing streams, and the White River. There are six major tributaries within the drainage basin. Killbuck Creek, Duck Creek and Pipe Creek drain the area north of the White River while Buck Creek, Cabin Creek and Stoney Creek drain the area to the south (Hoggart 1975)

The drainage pattern in the Upper White River drainage is controlled to some extent by old glacial features. The pattern is regionally dendritic and locally parallel to sub-parallel. Stream deflection, local watershed divides and the density of drainages is a result of glacial topography. Drainage is best developed along the White River and its main tributaries. Small infiltration basins or kettles have created some small, closed drainage basins. Some of the depressions may be associated with till-covered sink holes in limestone bedrock. There are no natural lakes in the Upper White River drainage (Shurig 1974, Gefell 1983, Chen and Caturvedi 1992).

2.1.8 Climate

The modern climate of Indiana is described as a humid, mesothermal-microthermal, continental climate” (Newman 1966:171). This refers to Indiana’s lack of average humidity less than 50% and cold periods of winter and hot periods of summer (Newman 1966:171). Northern Indiana is within the microthermal unit which has a cool temperature climate like those found farther north and east, whereas southern Indiana is a part of the mestothermal unit which has a warm temperature climate similar to those areas in the south and west (Newman 1966:171). Central Indiana experiences alternate flows of cool Canadian air with tropical air from the south which causes daily and seasonal variability in the climate (Hosteter 1978:1). Table 2 provides some information on the modern climate within the Upper White River drainage.

Table 2
Modern Climatic Data

County	Avg. Daily Max. January	Avg. Daily Min. January	Avg. Daily Max. July	Avg. Daily Min. July	Annual Precipitation
Randolph (Neely 1987:89)	33^0	16^0	84^0	62^0	37.2”
Delaware (Huffman 1972:63)	37^0	20^0	86^0	62^0	39.7”
Madison (Schermerhorn 1967:85)	37^0	21^0	86^0	64^0	38.0”
Hamilton (Hosteter 1978:60)	35^0	18^0	86^0	61^0	37.2”

Local climatic influences can be created by several natural features within the landscapes that human populations could anticipate. These areas would have affected prehistoric and historic utilization of the local environment and created site selected environments. Newman (1966:174) refers to these areas as “meso-climates and states that they are mainly caused by wind patterns produced by natural landforms such as major river valleys, the shore area around large lakes, high plateau areas and springs (Newman 1966:174-176).

The modern climate of Indiana is of course not an accurate reflection of the climate over the last 12,000 years. As other archaeologists have noted (e.g. King 1993:236), the reconstruction of paleoclimates have been hampered by ambiguous climatic data that have been used to support conflicting interpretations. Climatic change for the Upper White River drainage can only be discussed in generally accepted terms.

As the glacial ice retreated at the end of the Wisconsin Ice Age, the interglacial or Holocene period began a shift to warmer climate with conditions characterized as cool and moist. A warming period known as the Hypsithermal interval occurred between 9000 and 4000 years ago. During the Hypsithermal the precipitation may have decreased by 10 to 25% and the mean July temperature may have been 0.5 to 2^0 C higher than today. After the Hypsithermal the temperature has generally decreased and the precipitation has increased. A noted cool and wet climate is documented for the Little Ice Age (ca. AD 1450 to 1850), but alternating intervals of cool and wet with warm and dry periods have been suggested (Delcourt and Delcourt 1991, Holloway and Bryant 1985).

Climate is a significant factor in driving ecological processes. It regulates disturbance regimes such as wildfire, wind damage and flooding that in turn dictate the landscape mosaic. Environmental changes can result in new conditions that have profound effects on biota (Delcourt and Delcourt 1991:1, 152).

2.1.9 Biotic Communities

2.1.91.1 Flora

As the climate shifted in Indiana after the end of the Pleistocence, so did the plant species. Table 3 presents the transformation of the vegetative sequence constructed by Shane (1976) to reflect the general changes that took place with the region since the retreat of the glacial ice. Table 2 is a regional generalization and of course does not cover the Upper White River drainage specifically. Vegetative responses have not been recorded in sediments from the Great Lakes Region (Holloway and Bryant 1985:237).

Table 3
Vegetation Sequence of Central Indiana
(Cochran and Buehrig 1985:9, after Shane 1976)

AD 2000	Historic	Deciduous Forest
AD 1000	Late Woodland	
0	Middle Woodland	
1000 BC	Early Woodland	
2000 BC	Late Archaic	
3000 BC		
4000 BC	Middle Archaic	
5000 BC		Prairies and Open Vegetation
6000 BC		
7000 BC	Early Archaic/ Late Paleo Indian	Deciduous Forest
8000 BC		
9000 BC		Pine Maximum
1000 BC	Early Paleo Indian	Conifer-Deciduous Woodland
11000 BC		
12000 BC		Boreal Forest
13000 BC		Park Tundra
		Tundra or Open Areas
14000 BC		Periglacial Zone
15000 BC		Wisconsin Ice

With historic documentation, more detailed descriptions of the vegetation in central Indiana can be given. The historic forest descriptions should be representative of the deciduous vegetation occurring during the Woodland period. Petty and Jackson's (1966) study of the natural vegetation of Indiana in 1816 show the Upper White River drainage dominated by the beech-maple forest association but with a large pocket of oak-hickory forest in Delaware and Madison counties. The beech-maple forest developed from the mesophytic forest as northward postglacial migration occurred. Beech-maple forests usually have beech as the most abundant canopy tree with sugar maple co-dominate in the canopy and dominant in the understory. Other species occurring in beech-maple forests include: black walnut, white oak, burr oak, red oak, tulip poplar, white ash, American elm, slippery elm, cork elm, basswood, black gum, hickory sassafras and black cherry. Small tree understory is generally either redbud-dogwood-blue beech or dogwood-hop hornbeam. Shrub layers usually include pawpaw, spicebush, greenbriar, elderberry, leatherwood, wahoo and maple-leaf viburnum. The most prominent herbs occur in the spring with rue anemone, jack-in-the-pulpit, spring beauty, cutleaf toothwort, pretty bedstraw, mayapple, false Solomon's seal and wild ginger. The oak-hickory forest is dominated by white and red oak trees with sugar maple, swamp whit oak, pignut and shagbark hickory, bur and chinquapin oak, American and slippery elm, American beech, white ask and bur oak secondary. Wet or lowland oak-hickory forests contain bur oak, pin oak, swamp white oak, Shumards oak and bitternut hickory. The understory of oak-hickory forests is less well developed than beech-maple forests and frequently contains only one or two of the hop hornbeam, blue beech, dogwood, serviceberry and maple species. Oak-hickory forests have more herbaceous species than beech-maple forests including pussy-toes, common cinquefoil, wild licorice, tickclover, blue phlox, waterleaf, bloodroot, Joe-pye-weed, woodland asters and goldenrods, wild geranium and bellwort that are more prominent in late summer and autumn (Petty and Jackson 1966).

Generalized maps of forest associations do not account for smaller areas of different vegetation. The Upper White River drainage would have also contained areas of flood plain forest and prairie. A study of flood plain forests along the East and West forks of the White River found the following species dominant: silver maple, sycamore, American elm, cottonwood, hackberry, cork elm, box-elder, black willow, white ash and red elm (Petty and Jackson 1966:276). The same study found the predominance of hawthorn, redbud, wild plum, hop hornbeam and flowering dogwood in the understory; elderberry, spice bush, wahoo, swamp-privet, wafer-ash and pawpaw in the shrubbery; and poison-ivy, gapes, green briar, trumpet creeper and Virginian creeper in the vines (Petty and Jackson 1966:276). Beech and tulip poplar would have been important in flood plain forests in pre-Euroamerican times, but are now absence due to the clearing of the forests for agriculture and more widely fluctuation stream levels (Petty and Jackson 1966:277). The General Land Office (GLO) surveys record several expanses of prairie in the Upper White River drainage. Both warm season and cool season species of grass occur in Indiana prairies providing a continuous and prolonged cover from early spring to early fall (Petty and Jackson 1966:289).

Only three archaeological sites in the Upper White River Valley are known to have a documented floral analysis. The Jarrett site (12-Dl-689), an Albee site with two salvaged pits features is located in the floodplain of the White River (McCord 2001). The features contained corn and squash with fleshy fruit and grass (Bush 2001:Appendix B). Jarrett did not contain the diversity of plants recovered from the Albee Phase Morell-Sheets site in Montgomery County. Morell-Sheets had a larger sample of Albee features that contained crops of little barley and corn with maygrass, knotweed, possibly squash, and wild plants of hazelnuts, raspberry/blackberry, blueberry/cranberry, elderberry and grape (Bush 1994).

The Late Prehistoric Strawtown Enclosure (12-H-883) is located on a terrace in the White River Valley at Koteewi Park. Both Oliver and later Oneota occupations have been documented at the enclosure (White et al. 2002, White et al. 2003, McCullough et al. 2004). Analysis of flotation samples revealed the presence of several cultivated and wild floral species (Bush 2002, 2003, 2004aaa). The Oliver features at the site revealed corn was the most important cultivated crop. Both 8-row and 10-row cob fragments have been recovered. Other cultivated or possibly cultivated crops included beans, tobacco, squash, little barley, chenopod, amaranth, maygrass and probably sunflower. Nutshell at the site was dominated by hickory, but walnut, hazelnut, and acorn were also present. Other wild plants included bramble (blackberry, raspberry, etc.), strawberry, sumac, bedstraw, purslane, grape/virginia creeper, mulberry, wild legume, smartweed, stick-tight, tick-trefoil and grass. Features that contained Oneota ceramics at the enclosure also contained corn and beans as crops with squash as the only other possible cultigen. Nutshell was dominanted by hickory, then acorn and hazelnut. Wild plants included bramble, grass, stick-tight, pokeberry, and daisy family. The wood charcoal from the Oliver occupation at enclosure was dominated by hickory, followed by oak, sycamore, ash, walnut/butternut, American hornbeam, red elm, red oak, walnut, dogwood, tuliptree and maple/boxelder. Wood charcoal from the features containing Oneota ceramics was dominated by oak, then hickory, ash, hackberry, beech and tuliptree (Bush 2002, 2203, 2004a).

The Castor Farm site (12-H-3) is located on a lower terrace in the White River Valley just below the Strawtown enclosure at Koteewi Park. The Late Prehistoric site is related to the Western Basin Tradition (McCullough et al. 2004). The occupants were corn agriculturists that grew squash, maybe little barley and perhaps erect knotweed (Bush 2004a). Wild plants from the site were documented as chenopodium or amaranth, hickory and walnut/butternut nuts, blackberry, purslane, grasses and sumac. Oak and hickory dominated the wood charcoal, but also included walnut, sycamore, elm, maple, chestnut, beech and dogwood.

2.1.9.2 Fauna

The animals living in Indiana would have changed from the end of Pleistocene through Holocene times. Various Pleistocene age fauna have been found in Indiana. Early twentieth century accounts list bison, giant beaver, caribou, Virginai deer, dire wolf, elk, horse, mammoth, mastodon, musk-ox, peccary, sloth and perhaps moose (Moodie 1929, Lyon 1936). More recent investigations have expanded this list to include moose, caribou, black bear, giant short-faced bear, giant tortoise, white-tailed deer, Canadian goose, armadillo, jaguar, sabertooth tiger and camel (Richards 1984).

In 1816, an estimated 66 species of mammals were present in Indiana (Mumford 1966:475). Some of the common mammals found in Indiana include opossum, eastern cottontail, eastern chipmunk, white-tailed deer, beaver, deer mouse, white-footed mouse, meadow vole, pine vole, muskrat, southern bog lemming, Norway rat, coyote, red fox, gray fox, raccoon, long-tailed weasel, various species of squirrels, mice and shrews. Twelve species are listed as exterminated from Indiana and include bison, wapiti, porcupine, gray wolf, red wolf, black bear, fisher, eastern spotted skunk, wolverine, river otter, mountain lion and lynx (Mumford 1966:475).

Historic sources also report a large variety of other fauna in Indiana. Webster (1966:455-473) identifies 366 species of birds. A total of 177 species of fish have been identified (Gammon and Gerking 1966:401-425). Approximately 200 species of mollusks and 400 species of crustaceans occurred in Indiana waters. Approximately 82 species of amphibians and snakes have been identified (Minton 1966:426-451). The species can be subdivided into 19 species of salamanders, 2 species of toads, 11 species of frogs, 6 types of lizards, some 30 types of snakes, and 14 turtle varieties (Minton 1966:426-451).

Faunal analysis from archaeological sites in the Upper Whiter River valley is limited. Tools manufactures from faunal material from the multicomponent McKinley site in Hamilton County contain deer and mussels (Justice 1993). Animal remains from the Late Woodland Albee Phase Jarrett site (12-Dl-689) was degraded and small but contained deer, turtle, elk and fresh water mussels (McCord 2001). Faunal material from the Late Prehistoric Strawtown Enclosure (12-H-883) (White et al. 2002, 2003, McCullough et al. 2004) found a diverse and distinctive composition of species (Garniewicz 2002, 2003). White-tailed deer dominated the sample, but elk, bear, dog, porcupine, raccoon, gray fox, muskrat, beaver, cougar, gray squirrel, chipmunk and mice were documented. Relatively small amounts of birds including turkey, grouse, Canadian goose, wood duck and passenger pigeon were noted. Several species of turtle and tortoise were found, but fish were poorly represented. Bone tools from the Late Prehistoric Castor Farm site (White et al. 2004) were manufactured from deer, elk, bear, turkey, porcupine, turtle shell and mussel shell (Garniewicz 2004). A preliminary review of the faunal material from the surface of the Taylor Village site (12-H-25) was also dominated by deer, but bear, wapiti and beaver were well represented (Cochran et al. 1993). Occupation of Taylor Village ranges from Early Archaic to Late Prehistoric, but the material is dominated by an Oneota component.

2.1.10 Summary

As the ecological and natural setting of the project area changed and evolved over the last several thousand years, human settlement would also have changed. Settlement and use of resources within the project area would have been influenced by potential plant and animal resources and, conversely, may have influenced changes in flora and fauna (Delcourt and Delcourt 1991:87-89). The diversity of habitats that existed in the Upper White River drainage would have attracted prehistoric populations for the wide variety of natural resources available as food and raw materials in the production of tools, clothing, adornment and shelter.

2.2 Archaeological Background

2.2.1 Culture History

The natural setting of the Upper White River Valley demonstrates a hospitable environment following the retreat of the glaciers. Native Americans inhabited the region from the Paleoindian through the Historic period. A brief review of our current understanding of the culture history of the Upper White River Valley follows (Cochran 1993, Cochran 2004, James and Johnson 1999, Justice 1987, Kellar 1983, Swartz 1981). A more expanded description of the Albee and Oliver Phases will be presented since they were the focus of this project.

Paleoindian cultures entered Indiana as the Wisconsin glacial advance began retreating to the north circa 12,000 to 10,000 BP. Paleoindian sites are generally small surface scatters located in upland areas resulting from small family bands wandering over large territories in search of game animals. The defining artifacts from this time period are the lanceolate point forms including fluted Clovis points and unfluted Agate Basin, Hi-Lo, Holcombe, Plainview and Dalton points. No Paleoindian sites with *in situ* deposits have been excavated with the Upper White River Valley or in Indiana.

During the Early Archaic (10,000 to 8,000 BP), people were adapting to a warming environment that changed floral and faunal resources in the region. Early Archaic sites may be larger than the previous Paleoindian sites, but data for the Upper White River Valley does not confirm this. Early Archaic sites are found on almost every land form and Early Archaic point styles are the second most frequently found in the region. Technological changes are displayed in a larger diversity of projectile points with new hafting techniques. Point forms such as Big Sandy, Lost Lake, Charleston, St. Charles, Thebes, Decatur, Kirk, Palmer, MacCorkle, St. Albans, LeCroy and Kanawha have been reported from the Upper White River Valley. While Thebes, Kirk and Bifurcate Traditions occur in the region, no excavation data is available from the region. Ground stone tools make their first appearance during this time.

Middle Archaic (8,000 to 5,000 BP) cultures are associated with a warming and drying period that occurred across the Midwest, once again changing the resources available. More residential stability and a broader food base are suppose to occur during the Middle Archaic, but very few sites of this age are found in the Upper White River Valley. Sites are found in valley and valley edge settings with supposed decreased emphasis on the uplands. Point styles from this period found in the region include: Raddatz, Godar, Stanley, Karnak and Matanzas. Ground stone tools become more varied during this time.

With the Late Archaic (5,000 to 3,000 BP), the environment stabilizes to the conditions and deciduous forests encountered by Historic Euroamericans. Late Archaic artifacts are the most frequently encountered in the region and occur across the landscape. While Late Archaic sites are some of the largest in the region, they are often multicomponent. The exact nature of Late Archaic settlement is unclear although seasonal, scheduled occupations are suspected. The economy appears to have been diffuse and the cultivation of native plants develops. The high frequency of these sites has led some to the conclude that populations increased. Trade networks are more visible than in previous periods with the occurrence of copper and marine shell. Diagnostic projectile points from the region include: Mantanzas, Late Archaic Stemmed, McWhinney, Karnak, Lamoka, Table Rock, Brewerton, Riverton and Turkey Tail. The worked bone industry seems more elaborate. Cultures, phases or foci from this period include French Lick, Maple Creek, Glacial Kame and Riverton. The McKinley site (Justice 1993) is a regional example of multicomponent site with a Late Archaic occupation.

The Early Woodland period (3,000 to 2,200 BP) is marked by the introduction of pottery. Ceremonialism is heightened as evidenced by the construction of mounds and earthworks. Early Woodland habitations occur infrequently in the region, but the ceremonial sites are very visible. Hunting, gathering and limited horticulture continue during this period. Early Woodland ceramics found in the region are defined as Marion Thick. Diagnostic points include Cypress, Motley, Dickson, Kramer, Cresap, Adena and Robbins. Archaeological units that may occur in the area are Marion and Adena. No Early Woodland habitations have been excavated in the area. The earthworks at Mounds State Park (Vickery 1979, Cochran and McCord 2001) are an example of the ceremonial sites that begin at the latter end of this period.

The Middle Woodland period (2,200 to 1,400 BP) marks a climax in ceremonial behavior. The habitations, similar to Early Woodland, occur infrequently in the region. The economy continues to focus on hunting, gathering and limited horticulture, but maize is introduced during this time. Exotic goods are frequently found at the ceremonial sites and demonstrate an expansion of trade networks. Middle Woodland ceramics found in the region are New Castle Incised, Adena Plain, McGraw and Scioto series. Diagnostic lithics include Robbins, Snyders, Lowe, Chesser, and Steuben points and lamellar bladelets. Archaeological units that may occur in the area are Adena and Scioto. No habitation sites with in situ Middle Woodland deposits was been excavated in the region. The earthworks at Mound State Park (Vickery 1979, Cochran and McCord 2001) are an example of ceremonial sites from the early end of this period. By AD 300, elaborate mound building ended in the region.

The Late Woodland period (1,400 to 800 BP) sites occur in the third highest frequency in the region. The period shows a decline in the importance of mounds. The bow and arrow is introduced and the cultivation of domestic crops rises in importance. Maize becomes an important addition to the diet. Pottery is rarely found outside of the floodplain. Ceramic styles found in the region include Jack’s Reef, Albee and Western Basin. Diagnostic lithics include Lowe, Chesser, Steuben, Racoon Side Notched, Jack’s Reef Corner Notched and Triangular Cluster points. Archaeological Phases recognized in the region include Intrusive Mound and Albee. The Albee Phase will be discussed in more detail below.

The Late Prehistoric period (1000 to 300 BP) shares the traits of the Late Woodland but show adaptation to a more focused economy based on corn agriculture. Village sites with segregated activity areas and palisades occur. Along with maize horticulture, beans and squash also become important and the importance of cultivated native crops declines. Ceramics from this period are Bowen, Oliver, Fort Ancient, Western Basin and Oneota. Triangular points are the only projectile form used. Archaeological units from the period are Oliver, Western Basin and Oneota. The Oliver Phase will be discussed in more detail below.

2.2.2 The Albee and Oliver Phases

2.2.2.1 The Albee Phase

The Albee Complex was first recognized and defined by Howard Winters (1967) from survey data in the Wabash Valley in Illinois and Indiana. The only distinctive artifact in the complex was a cordmarked, grit-tempered jar with a wedge-shape rim. All the other artifacts associated with the complex were also present in other Late Woodland assemblages. Following Winters' (1967) definition, the Albee Complex became an accepted term for identifying Late Woodland artifacts and sites, particularly in the Wabash Valley.

Halsey (1976) expanded the definition of the Albee Complex to the Albee Phase and included it as part of the early Late Woodland Wayne Mortuary Complex of the Eastern Woodlands. Halsey (1976) identified two phases of the Wayne Mortuary Complex in Indiana: the Walkerton Phase in northern Indiana and the Albee Phase across the remainder of the state.

After 30 years of research, the Albee Phase remains little more than an Indiana/Illinois variation of a generalized Late Woodland artifact assemblage that occurred throughout the Eastern Woodlands. Although numerous sites are associated with the Albee Phase, it is a poorly defined manifestation (Anslinger 1990, Schurr 2003). Most of the information available on the Albee Phase comes from mortuary sites, mixed multicomponent habitations, and surface collections. Although the Albee Phase is an accepted and common archaeological unit in Indiana overviews (Kellar 1983, Swartz 1981, Redmond and McCullough 2000), the definition is untested with data from a representative sample of excavated habitation sites. Excavations at the Morell-Sheets site in west central Indiana helped to clarify some of the problems with the Albee Phase (McCord and Cochran 1994). The Morell-Sheets site assemblage provided the largest sample of data from a habitation with contextual information from a virtually unmixed Albee component(s). The site provided specific data on Albee Phase chronology, ceramics, lithics, and floral and faunal exploitation (McCord and Cochran 1994). The features and midden spanned the range of the Albee Phase providing a radiocarbon sequence between AD 800 and 1200 (calibrated AD 800 to 1300).

Our current characterization of the Albee Phase places it between approximately cal AD 800 and 1300, but internal variation in artifacts and mortuary practices have been recognized within this 500 year period (Halsey 1976, Cochran et al. 1988, McCord and Cochran 1994, White 1998, Havill et al. 2003, Schurr 2003). The distribution of Albee Phase sites ranges across most of Indiana and eastern Illinois (Winters 1967, Halsey 1976, McCord and Cochran 1994, McCullough 2000, Schurr 2003) and variation in the material culture from different regions has been recognized (Halsey 1976, Havill et al. 2003, Schurr 2003, McCord and Cochran 2003a). While the wedge-shaped collared, grit tempered sherds that are typically embellished with tool or corded impression are distinctive of Albee, numerous artifacts have been associated with the Albee Phase. Other artifacts include Jack's Reef Cluster points, Triangular Cluster points, Commissary knives, shell beads, copper beads, slate gorgets, copper gorgets, bone awls, antler drifts, antler arrow points, bone whistles or flutes, antler or bone hooks, antler harpoons, bone needles, bone beamers, modified deer phalanges, modified animal jaws, raccoon bacula tools, modified turtle carapace, gravers, perforators, lamellar blades, endscrapers, chipped stone adzes, bipolar cores, ceramic pipes, straight base platform pipes, and sandstone abraders (Winters 1967:60, 68-69, Tomak 1970, Halsey 1976:559-582, Kellar 1983:50, Cochran et al. 1988:48-65, Anslinger 1990:51, McCord and Cochran 1994:9-12). Albee settlement patterns indicate that the cemeteries and habitation sites are typically associated with the valleys of major drainages (Anslinger 1990:51). It appears that cemeteries and habitations were associated, but spatially segregated with the habitation sites occurring on the valley floor and cemeteries occurring along upland or terrace edges (Tomak 1970, Cochran et al. 1988, McCord and Cochran 2003a). At least some of the valley floor habitations were semi-sedentary or seasonal occupations focused on horticulture (McCord and Cochran 1994, McCord 1998, 2001). Albee sites are likely dispersed into the uplands also, but distinguishing Albee sites from other aceramic Late Woodland/Prehistoric sites is not currently possible since the Triangular Cluster points are common throughout. Subsistence practices including the cultivation of Eastern Agricultural Complex plants (little barley, maygrass and knotweed) and maize in addition to wild plants. Animal remains identified have been dominated by white-tailed deer but turtle, porcupine, wapiti, beaver, raccoon, turkey and mussels are present.

While archaeologists are moving toward a better conception of the Albee Phase, it is still ill defined as an archaeological unit. The Albee Phase has become a catch-all for every Late Woodland manifestation and confusion is furthered by "fortuitous taxonomic constructs" (eg. Stothers 1992). The numerous problems in defining the regional variation, internal chronology, relationships to other archaeological units, settlement patterns, and settlement systems of the Albee Phase inspired the current research project.

2.2.2.2 The Oliver Phase

The Oliver Phase was first identified from sites in the Indianapolis area where surface collections contained a mixed assemblage of ceramics with suggested affinities to Fort Ancient, Oneota and Great Lakes Woodland wares (Dorwin 1971, Griffin 1966, Helmen 1950, McCullough 1991, 2000, Weer 1935). Determining the cultural relationship and interaction of these materially different populations has been a source of archaeological investigations for several decades. Weer (1935) and Householder (1941, 1945) were the first to publish on sites containing this mixture of ceramics and ponder the relationships between Woodland culture groups and Fort Ancient culture groups. Griffin (1966) addressed the mixture of ceramic styles in *The Fort Ancient Aspect*, concluding that the material was basically Woodland with elements of Fort Ancient. Helmen's (1950) work at the Oliver Farm site was the first intensive comparison of ceramics and he defined several pottery types including Oliver Cordmarked and Oliver Cordmarked and Incised. Oliver Cordmarked and Incised were related to Anderson and Madisonville Fort Ancient influences in addition to Fisher. Other Unclassified types were related to ceramics from the Younge and Riviere au Vase sites in Michigan and sites in northern Ohio. A few miscellaneous sherds showed both Woodland and Fort Ancient decorative styles on the same sherd. Dorwin's (1971) work with excavated materials from the Bowen site became the type site for the Oliver Phase. He expanded Helmen's (1950) ceramic type description, defining several of the Unclassified types as a Bowen series including: Bowen Cordmaked with Cord Impressed, Punched and Plain varieties; Bowen Sharply Everted Rim; Bowen Fabric Marked; and Bowen Collared with Cambered and Straight varieties. While the Oliver series ceramics were still recognized as related to Anderson and Madisonville Fort Ancient, the Bowen series was related to Canton Ware and Madison Cord Impressed of Wisconsin and northern Illinois. The Bowen site analysis showed that both the Oliver series and the Bowen series co-occurred in the same features.

Robert McCullough has a long history of investigating the Oliver Phase (McCullough 1991, 2000; McCullough et al 2004; Redmond and McCullough 1993, 1996, 2000; White et al 2002, 2003; Wright and McCullough 1997). McCullough's (1991) reanalysis of the Bowen site confirmed that the Oliver and Bowen ceramics do occur in the same feature, but the different ceramic traditions were concentrated in different parts of the site and were predominantly spatially separated. Currently, interpretations of the Oliver Phase rely on the migration of several cultural groups attracted to the White River drainage for its agricultural potential (McCullough 2000, McCullough et al. 2004). Middle Fort Ancient (AD 1200 to 1450) populations most closely related to Anderson Phase are hypothesized to have migrated into the White River drainage carrying some but not the full range of Fort Ancient cultural practices (McCullough et al 2004:24). The other population is related to the Springwells Phase (AD 1200 to 1300) of the Western Basin tradition, based on the Great Lakes impressed decorative styles. Due to differences in ceramic vessel form and placement of the decoration in addition to cultural differences such as mortuary practices, this population is not perceived as a wholesale migration (McCullough et al. 2004). In contrast, Stothers and Schneider (2003) support the notion of a Springswells migration to the White River following their dispersal by the Wolf Phase. While the derivation of these two contrasting ceramic traditions is still contested, the co-occurrence of Oliver series (Fort Ancient style) and Bowen series (Great Lakes Impressed style) is considered the defining characteristic of the Oliver Phase (McCullough 2000, McCullough et al. 2004:33). In Early Oliver, the Fort Ancient and Great Lakes Impressed styles do not occur on the same pot, but by the mid 14th century a blending of the motifs occurs that is interpreted as a more complete merger of the two groups (Bush 2004b:39, McCullough 2002, McCullough et al 2004:31).

Aside from characterizations concerning ceramics, the Oliver Phase has recently been described, as an “elastic” concept (McCullough et al. 2004:28-32). The Oliver Phase dates between AD 1200 and 1450 along the drainages of the east and west forks of the White River. It is described as a sedentary, village dwelling society that were farmers. Settlements with Oliver Phase components are diverse with examples of nucleated circular villages that can sometimes be surrounded by wooden stockades and ditches, examples of linear settlements along natural levees, as well as examples of small dispersed farmsteads on low terraces or higher floodplain elevations. Domestic structures although rare, consist of subrectangular bent pole or circular wall trench and post construction. Mortuarty activities occur in habitations, and no separate Oliver Phase cemeteries have been identified.

Material culture associated with the Oliver Phase has many commonalities with other Late Woodland/Prehistoric cultures in the Midwest. Artifacts include: Triangular Cluster points, hump-backed knives, flake tools, few endscrapers, few ground stone tools including sandstone abraders, pitted stones, grinding stones and small celts, and an extensive bone and antler tool technology including beamers, awls, fish hooks, antler arrow points, and antler flakers (McCullough et al 2004:31). Shell hoe technology has not been identified, but a scapula hoe is reported at the Bowen site (McCullough et al 2004:31). Pottery styles as discussed above, typically occur on globular jars. A few bowl forms are also noted in Oliver Phase assemblages. Pottery pipes have also been documented, but pottery disks are rare (McCullough et al 2004:31).

In terms of subsistence, the Oliver Phase people were horticulturists with subsistence supplemented by hunting and gathering (Bush 2004b, Garniewicz 1998, McCullough et al. 2004). Corn was an important crop. Other cultivated or possibly cultivated crops include beans, tobacco, squash, little barley, chenopod, amaranth, maygrass and possibly sunflower. Other plants common on most sites were hickory, black walnut, hazelnut, blackberry, sumac, purslane and grape family. In comparison with Fort Ancient and Mississippian plant use, the Oliver Phase sites cluster together but not in exclusive groups as there is overlap with Fort Ancient and Mississippian use. Oliver Phase faunal use relied primarily on mammals in particular white tailed deer, with smaller amounts of fish, birds and reptiles.

By the 14th and 15th centuries, Oliver Phase ceramics have also been found in association with Oneota groups (McCullough et al 2004:33). A few Oliver Phase sherds have been associated with Smith Valley complex sites and Taylor Village ceramics.

McCullough’s model of the Oliver Phase has been critiqued (McCord and Cochran 2003a, Stothers and Schnedier 2003). Concerns range from a lack of definition for the Oliver Phase (Stothers and Schnedier 2003:177) to overly generalized characterizations (McCord and Cochran 2003a:34-35). The elastic nature of the Oliver and Albee Phases creates problems for defining the Late Woodland/Prehistoric period of the Upper White River drainage.

2.2.3 Woodland Settlement in the Upper White River Drainage

In addition to the field survey component of this project, background research of Late Woodland settlement was undertaken. While an examination of Albee Phase settlement was the intended goal of this background research, an understanding of Albee settlement patterns required a regional context for Woodland settlement in general. Albee Phase habitation sites have been found in the valleys of major drainages across most of the western and central portions of Indiana but further refinement and understanding of Albee settlement patterns is needed.

2.2.3.1 Methods

Information from ARMS and DHPA site files was collected for Late Woodland and other Woodland and Late Prehistoric components within the Upper White River drainage above the Marion/Hamilton county line. The drainage included the counties of Hamilton, Madison, Delaware and Randolph. Woodland and Late Prehistoric components were identified based on the recorded cultural period or diagnostic artifacts listed on site forms. Albee sites were recorded based on diagnostic ceramics. In some cases, site information was too vague and the site was eliminated. Only habitation site data was used for this study. Mortuary or mound sites were considered as separate from secular use of the landscape and were not included at this time.

Several types of data concerning Woodland and Late Prehistoric sites were entered into a database. The fields included the cultural period, UTM location using the 1983 NAD, soil series, environmental setting, drainage, slope and diagnostic artifacts present. The environmental setting was examined at several levels. First. a "macrozone" was identified using Geologic 1^0 x 2^0 Quadrangle (Burger et al. 1971). The engineering soils maps for each county provided a "microzone" (Chen and Caurvedi 1992, Gefell 1983, Shurig 1974). The specific landform and adjacent landforms were taken from the county soil surveys (Hosteter 1978, Huffman 1972, Neely 1987, Schermerhorn 1967) and USGS topographic maps. This database was then integrated with ArcMap 9.0 for spatial analysis (Appendix A).

Several biases were recognized during the data gathering. First, the quality of the data recorded on site forms was not equal. Some of the site information was several decades old, obtained from collector interviews, or not gathered by modern systematic survey. Second, few archaeological surveys have been conducted in Randolph County in comparison with the other counties. This includes both CRM and grant funded projects. Third, archaeological surveys have focused on the White River Valley. Till plain and upland areas outside the valley are underrepresented. Fourth, Triangular Cluster points (arrow points) are not technologically equivalent to knife/dart/spear points and cannot be considered quantitatively equal.

2.2.3.2 Results

2.2.3.2.1 Data

From the Upper White River drainage, 305 Woodland/Late Prehistoric sites were identified (Figure 2)(Appendix A). By county and drainage basin area, the distribution was as follows: 149 sites in Hamilton County in approximately 401 mi^2, 49 sites in Madison County in approximately 171 mi^2, 97 sites in Delaware County in approximately 264 mi^2, and 10 sites in Randolph County in approximately 120 mi^2. The number of Woodland/Late Prehistoric sites within the Upper White River drainage is fairly evenly distributed per square mile in Hamilton, Madison and Delaware counties. (One site between 2.7 and 3.5 mi^2). Randolph County is poorly represented (one site per 12 mi^2), but this is likely due to sampling since far fewer surveys and sites are recorded in Randolph County.

Table 4 provides a breakdown by cultural period. Over one-third of the sites recorded were multicomponent and over two-thirds of the sites had a Late Woodland/Late Prehistoric component. This table does not differentiate between a Late Woodland component consisting of a Triangular point or a Jack's Reef point, so multicomponent sites are probably underrepresented since different components of the same era were not separated.

Table 4
Woodland Components

Single Cultural Period	No.	%	Sites w/ Component	No.
Woodland only	44	14.4	Woodland	44
Early Woodland only	14	4.6	Early Woodland	34
Middle Woodland only	22	36.4	Middle Woodland	52
Late Woodland/Prehistoric only	111	7.2	Late Woodland/Prehistoric	204
Multicomponent	114	37.4		
Total	305	100%		

2.2.3.2.2 Landform Distribution

The distribution of Woodland/Late Prehistoric sites was examined by environmental zone and landform. The landform data had the best results for examining patterns. The "macro" and "microzone" distributions were felt to be too broad to discuss landscape use.

First, the data was examined by cultural period. Early Woodland sites contained Adena, Robbins, Dickson, Rossville, Schultz or unclassified Early Woodland points. The temporal range for these sites is ca. 500 B.C. to A.D. 200 (Justice 1987). Middle Woodland sites contained Snyders or Middle Woodland Expanding Stem points (Lowe, Steuben, Chesser or Marshal Barbed) and lamellar bladelets. The temporal range for these sites is 200 B.C. to A.D. 600 (Justice 1987). Late Woodland/Late Prehistoric sites contained Jack's Reef, Raccoon Notched, Logan, Triangular, Nodena and unclassified

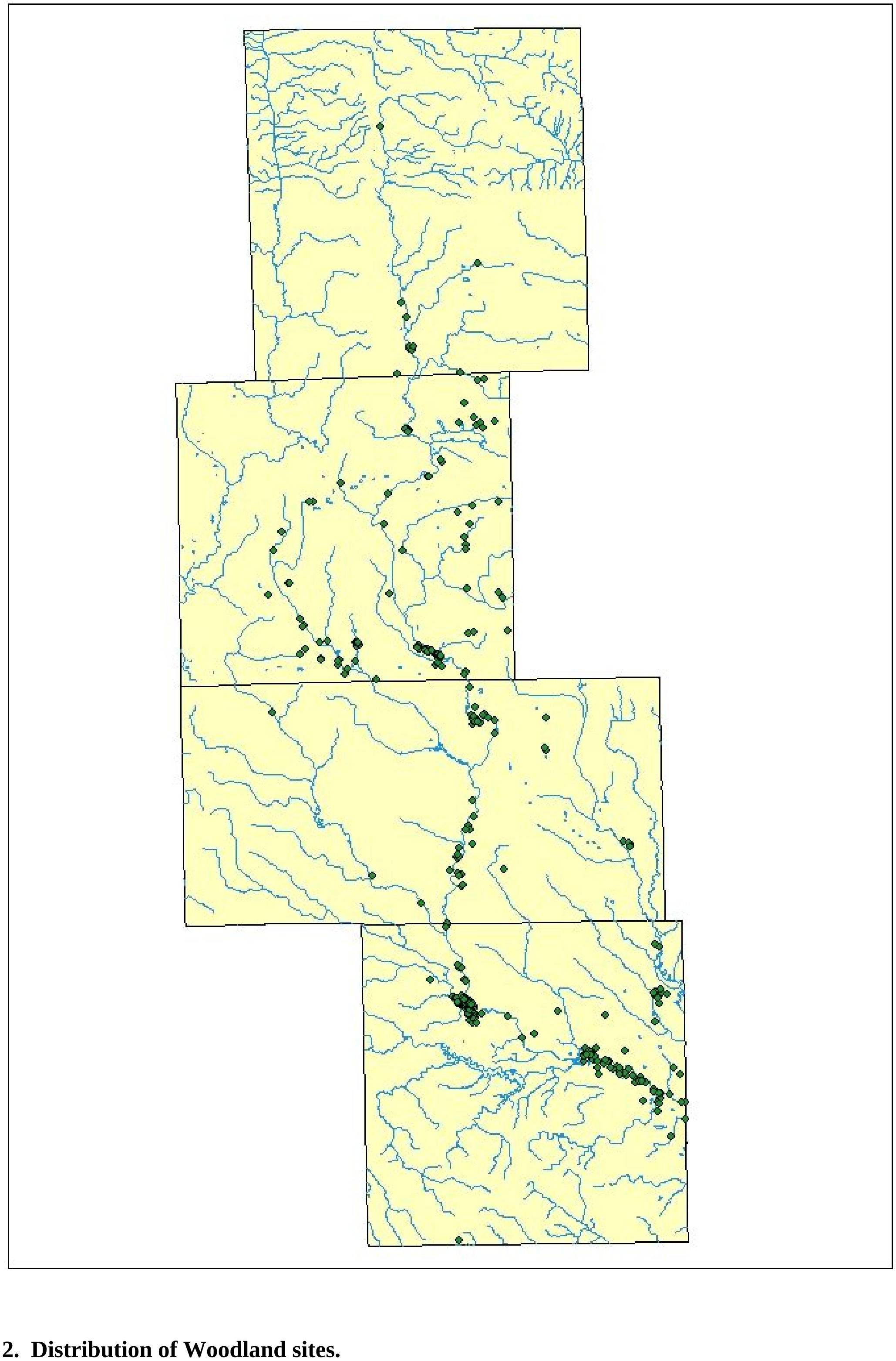

Figure 2. Distribution of Woodland sites.

Late Woodland points. Late Woodland also contained diagnostic ceramics of Albee or Oliver Phase. The temporal range for these sites is A.D. 600 to 1600 (Justice 1987). Table 4 shows the distribution of Woodland/Late Prehistoric sites by cultural period.

There is no distinctive pattern of landform use or change over time. Settlement patterns and landscape use during the Woodland/Late Prehistoric period were obviously complex and do not distill into a neat normative package that is so often sought in archaeology. Interesting data on landform association are presented in Table 5.

Table 5
Settlement by Landform by Cultural Period

Landform	Early Woodland (n=34)	Middle Woodland (n=52)	Late Woodland (n=204)
Till Plain	38.2 %	28.8 %	31.8 %
Floodplain	8.8 %	30.8 %	29.9 %
Outwash Terrace	47.1 %	26.9 %	28.4 %
Outwash Plain			2.0 %
Lakebed			1.5 %
Kame/Esker			0.5 %
Floodplain/Outwash Terrace	2.9 %	9.6 %	4.4 %
Till Plain/Outwash Terrace	2.9 %	1.9 %	1.0 %
Outwash Terrace/Outwash Plain		1.9 %	0.5 %
Total	99.9 %	99.9 %	100.0 %

First, Early Woodland use of valley setting is nearly 60%, however very little of this settlement in on the valley floor/floodplain. This may indicate that Early Woodland populations were not using the floodplain or that, as previously proposed, Early Woodland sites are buried in alluvium and not recorded in surface surveys (Stephenson 1984, McCord and Cochran 1996).

Second, in comparing the Middle Woodland data, the landform use is quite similar to Late Woodland/Prehistoric use. There is a nearly equal use of till plain, floodplain and outwash terrace landforms. The use of valley landforms is nearly 70%, but there is a dramatic jump in the use of the floodplain from Early Woodland figures. This difference in floodplain use may be the result of sampling if Early Woodland sites are buried, or it may indicate the shift to the floodplain occurred prior to Late Woodland/Prehistoric. During the Middle Woodland, populations apparently began to expand the land base. The shift to higher use of the floodplain may be related to an increased emphasis on horticulture. However, there is no data from the Upper White River drainage to support or refute Middle Woodland horticultural practices.

Third, during the Late Woodland/Late Prehistoric era, the populations were utilizing the till plain, floodplain and outwash terraces nearly equally. These data seem to support a diffuse use of the landscape and exploitation of a variety of resources. Other researchers have noted the occurrence of Late Woodland sites in virtually all exploitable habitat zones rather than a concentration on narrow resource niches (Munson 1988, Douglas 1976).

Because the division of cultural periods lumped several diagnostic artifacts together and this obviously mixed components and generalized landform use over time, it was decided to look at diagnostic artifacts by landforms to see if the same general trends were evident. Table 6 provides a breakdown of diagnostic artifacts that had more than one occurrence.

Table 6
Settlement by Landform by Diagnostic Artifacts

Landform	Adena (n=21)	Robbins (n=4)	Dickson (n=3)	Snyders (n=21)	Bladelet (n-13)	MW Exp. Stem (=23)	Jack's Reef (n=27)	Triangles (n=166)	Pottery (n=110)
Till Plain	42.9%	25.0%		38.1%	15.4%	21.8%	48.1%	30.1%	4.5%
Floodplain	4.8%	25.0%		23.8%	46.2%	30.4%	22.1%	30.7%	66.6%
Outwash Terrace	42.9%	25.0%	100.0%	28.6%	23.1%	26.1%	11.1%	30.1%	19.1%
Outwash Plain	4.8%						11.1%	1.8%	
Lakebed								1.8%	
Kame/Esker								0.6%	
Floodplain/Outwash Terrace	4.8%	25.0%		9.5%	15.4%	13.0%	3.7%	4.2%	6.4%
Till Plain/Outwash Terrace						4.3%	3.7%	0.6%	2.7%
Outwash Terrace/Outwash Plain						4.3%			0.9%
Total	100.2%	100.0%	100.0%	100.0%	100.1%	99.9%	99.9%	99.9%	100.2%

For the Early Woodland point types, the Robbins and Dickson styles are too few to be viable. The distribution of Adena points follows what was stated above for the Early Woodland period. Since Adena points were the largest number of Early Woodland points reported, they had an affect on Early Woodland site distributions. For Adena points, the percentage found on floodplains declines slightly to less than 10%, though the valley edge and outwash terraces were used just as frequently as till plain landforms.

The Middle Woodland diagnostics show more internal variation. The increase in floodplain use is still present in all of the diagnostics, but is quite high in bladelets. Lamellar bladelets are a specialized tool and may represent functional differences. In the till plain, the distribution of Adena points and Snyders points is similar, but there is an increase in Middle Woodland points in the floodplain. Again this may represent a sampling problem if Early Woodland sites are buried in the flood plain. Approximately 40% of Adena and Snyders points occur in the till plain and approximately 60% occur in the valley. Middle Woodland Expanding Stem points occur less frequently in the till plain than Adena or Snyders points, so use of the valley appears to become more important.

The Late Woodland/Prehistoric sites also show internal variation. Jack's Reef points have a higher density in till plain settings than any other Woodland of Late Prehistoric points. The valley settings were utilized less than till plain settings. Triangular points appear nearly equally between till plain, floodplain and outwash terrace settings. This nearly equal exploitation of all environmental zones fits with generalized Late Woodland settlement models (Douglas 1976:75, Munson 1988:9). Of the 204 sites with Late Woodland components, 183 did not have diagnostic ceramics. Most ceramic sites are found in valley settings. While ceramics occurred most often on floodplains, they also occurred on outwash terraces and more rarely in the till plain. While not all ceramics can be attributed to the Late Woodland/Prehistoric, diagnostic Early and Middle Woodland ceramics have not been found on habitation sites in the Upper White River drainage.

2.2.3.2.3 Albee Settlement

Without the presence of ceramics, Late Woodland/Prehistoric phases cannot be differentiated. Albee and other manifestations all utilized Triangular points. Only 21 sites had diagnostic ceramics (Table 7). Table 8 shows the land use based on Albee, Bowen series, Fort Ancient series and Oliver ceramics (Figure 3). Oliver ceramics are defined as the co-occurrence of Bowen and Fort Ancient styles (McCullough 2000, McCullough et al. 2004).

Table 7
Sites with Diagnostic Ceramics

Diagnostic ceramics	Sites
Albee	12-Dl-297, Dl-689, H-3, H-985, and H-993
Bowen series	12-Dl-297, H-3, H-4, H-6/46, H-25, H-289, H-374, H-993, H-1031, and H-1035
Fort Ancient style	12-Dl-177, H-1, H-959, H-1006, and H-1034
Oliver (Bowen and Fort Ancient mixed)	12-M-266, H-354, H-837, and H-883

Table 8
Landform Use by Diagnostic Ceramics

Landform	Albee (n=5)	Bowen (n=10)	Fort Ancient (n=5)	Oliver (n=4)
Floodplain	40.0 %	40.0 %	40.0 %	50.0 %
Outwash Terrace		20.0 %	40.0 %	50.0 %
Floodplain/Outwash Terrace	60.0%	40.0 %		
Till Plain/Outwash Terrace			20.0 %	

While this sample of landform use by Albee and other Late Woodland manifestations is small and may change with future information, it does show differential landform use. Most obvious is the occurrence of Fort Ancient styles in the till

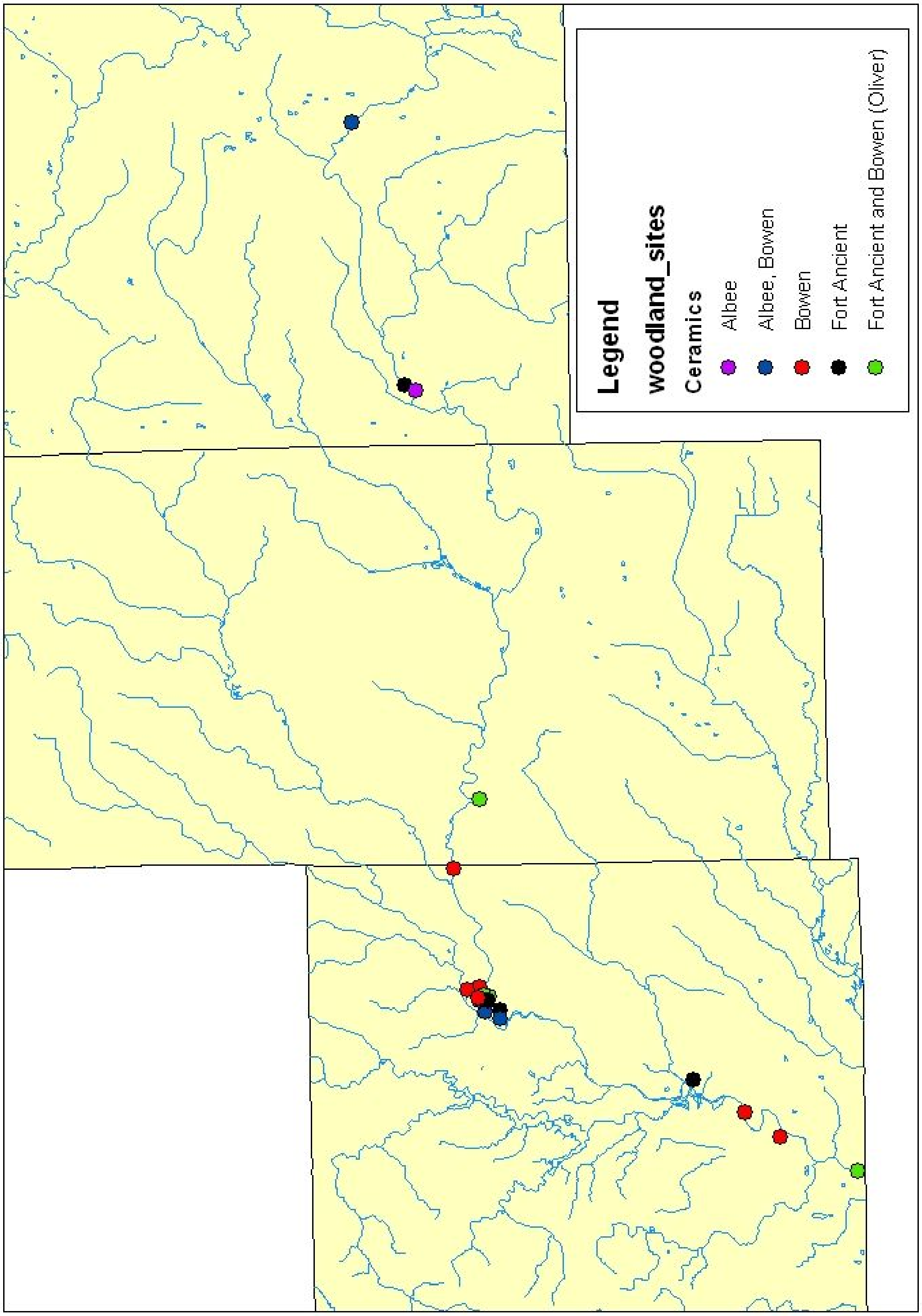

Figure 3. Distribution of diagnostic ceramics.

plain/outwash terrace setting. This occurs at the valley/till plain margin. Fort Ancient styles are the only ceramic types to occur in this setting. The Albee, Bowen and Oliver ceramics occur either on floodplain or outwash terraces that occur within the valley. They seem to indicate use of the active floodplains and the more stable terraces. Albee sites show a slightly higher tendency to utilize transitional areas of floodplain/outwash terraces.

Unfortunately, linking ceramic and aceramic data to examine settlement patterns is nearly impossible to achieve at this time. Triangular points that occur with Albee, Bowen, Fort Ancient and Oliver ceramics, show exploitation of a wide variety of landforms and potential resources, while ceramics show exploitation only in the valley. Ceramics are generally considered an indicator of semi-permanent occupation. If this is the case, then Late Woodland/Prehistoric population were only living in the valley for extended periods of time and using the upland till plain areas on a short term basis. Since each of these ceramic styles have been associated with horticulture, settlement near rich organic floodplain soils is not surprising.

2.2.3.3 Discussion

Investigation of Woodland settlement patterns in the Upper White River drainage showed variation in the utilization of landforms. Valley settings were important throughout the Woodland and Late Prehistoric periods; however, the use of floodplains, outwash terraces, and till plains varied by time and likely by culture. Settlement patterns during the Woodland/Late Prehistoric period were varied and complex. A normative, unilineal sequence of ever more "complex" Woodland settlement does not fit data recovered thus far from the Upper White River drainage.

3.0 ARCHAEOLOGICAL SURVEY

3.1 Introduction

One of the goals of this project was to survey areas of the Upper White River drainage that might contain Albee habitations. Hamilton County was chosen as the target area for this survey, since the White River Valley is more threatened than in other counties due to rapid urban expansion and gravel mining. We proposed to survey between 200 and 300 acres of agricultural land. Aerial photographs taken in 2002 were consulted for potential areas of survey. While we knew the valley had been impacted and was threatened by gravel operations, we were surprised by the scarcity of agricultural land remaining within the White River Valley in Hamilton County. We found only 10 sizeable tracts of land that appeared to be undisturbed, but some had been previously surveyed. We contacted 6 owners of properties that had not been previously surveyed in an effort to secure permission for survey. Four of the owners gave permission for the survey. We also selected a portion of land owned by Conner Prairie that had been previously surveyed by Ellis (1982) to obtain a large floodplain area for survey. We ultimately surveyed three properties representing 195 acres of land. A review of the survey and the sites documented follows.

3.2 Methods

This project was conducted by ARMS personnel and Ball State University field school students. The investigations were authorized under DHPA permit # 200419. The field survey was executed using pedestrian transects spaced at 5 meter intervals. A consistent survey interval of 5 meters was maintained throughout the surface reconnaissance. The areas surveyed by pedestrian transects had between 30 and 95% ground surface visibility. All artifacts, excluding fire-cracked rock and brick, were collected and bagged by site specific provenience. Fire-cracked rocks and bricks were counted in the field, but were not collected. Artifact locations were assigned temporary site numbers and recorded on a 2' contour map of the area and the site coordinates were collected with a Sokkia Axis^3 GPS using NAD 1983. Field notes were maintained by the author and the crew.

All artifacts were taken to the ARMS laboratory for processing, identification, analysis and temporary curation. Artifacts were cleaned, classified and catalogued. Definitions used for classifying prehistoric lithic materials were included in Appendix B. Metrical attributes and raw material identifications were recorded as appropriate. Lithic raw materials were identified by comparison with reference samples and published descriptions on file in the ARMS laboratory (Cantin 1994). Prehistoric ceramics were compared with published sources in the region. Historic artifacts were identified and dated using several references (Feldhues 1995, Fike 1984, IMACS 1984, Loftstrom et al. 1982, Majewski and O'Brien 1987, Miller 1995, Nelson 1964, Newman 1970, ODOT 1991). Notes, maps and photographs were reviewed and prepared for illustration and curation. State site numbers were obtained and a DHPA Sites and Structures Inventory form was completed for each site identified during the project. The GPS site coordinates collected during this project and digitized topographic maps, aerial photographs, soil surveys and 2' contour maps that were download from http://danpatch.ecn.purdue.edu/~caagis/ftp/gisdata/data.html, http://www.co.hamilton.in.us/gis/download.html, and Engel et al. (n.d.) were imported into ARCGIS 9.0 to create spatial maps and figures for this report. All materials generated by this project were accessioned under # 04.50. Artifacts were either curated at Ball State or returned to the landowner after documentation.

3.3 Results

Approximately 195 acres of agricultural land were investigated by the systematic field survey. The survey was conducted entirely in the White River Valley since Albee Phase sites and Late Woodland sites with diagnostic ceramics are known primarily from floodplain settings. The survey area covered outwash terrace (40 acres) and floodplain settings (155 acres). The field survey recovered 1227 prehistoric artifacts, 66 historic artifacts and 10 pieces of bone from 40 new and 8 previously recorded archaeological sites. Over 700 fire-cracked rocks were documented. The results will be discussed by survey area.

3.3.1 Riverwood Property

The Riverwood property, owned by the Central Indiana Land Trust, is located on the flood plain between Riverwood Avenue and the White River in Sections 20 and 21, Township 19 North, Range 5 East as shown on the USGS 7.5' Riverwood Quadrangle (Figure 4). This area is on the north side of the White River within a small bend of the river. The ground cover consisted of small planted trees and grass. The surface visibility ranged from 0 to 95% with average visibility between 50 and 60%. Approximately 39 acres of land were surveyed at this property. A section of the western portion of the property was not surveyed due to poor visibility (< 30% surface visibility). The area contains primarily Genesee soils on the valley floor with small areas of Ockley and Fox soils at the valley edge. Several east-west trending swales parallel the White River course cut across the otherwise nearly level plain. Recent alluvium was observed along the riverbank and one of the deeper swales during the survey. Seventeen archaeological sites were recorded in this field (Figure 5). The sites ranged from isolated finds to artifact scatters 13,626 m^2 (3.3 acres) in size. Components identified in the sites were Late Archaic, Woodland, Late Woodland/Late Prehistoric and Historic in age.

3.3.1.1 Artifacts

A total of 248 artifacts, 3 pieces of bone and 139 fire-cracked rocks were documented during the field survey. Table 9 provides a list of the artifacts recovered by category. The definitions of prehistoric artifact classes used are contained in Appendix B. Point types were classified using Justice (1987). Prehistoric pottery and historic artifacts were classified using a variety of published references and are discussed below. Artifacts are listed by individual site in Appendix C.

Site Locations Confidential

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Table 9 Artifacts Recovered from Riverwood Property			
Category	No.	Category	No.
Unmodified flakes	150	Points	2
Modified flakes	15	Other Chipped Stone	1
Bipolar	3	Pottery	53
Cores	4	Historic Ceramics	2
Bifaces	6	Glass	7
Endscraper	1	Metal	4

3.3.1.1.1 Prehistoric Artifacts

Only a few artifacts were diagnostic of a particular age. Of the six bifaces recovered, two were technologically part of Late Woodland Triangular point manufacture. The Triangular bifaces were manufactured from Fall Creek chert and recovered from site 12-H-1145 (Figure 6c and 6d).

The two points recovered were represented by one Riverton (Merom Cluster) point of Fall Creek chert and one Triangular Cluster point of Allens Creek chert (Figure 6a and 6b). Both points are missing the distal end. The Riverton point is Middle/Late Archaic in age dating to between approximately 2000 and 1000 BC (Justice 1987:130-132). The Triangular point is Late Woodland/Late Prehistoric in age, appearing at approximately AD 800 and continuing to Historic contact (Justice 1987:224-230).

Figure 6. Points from the Riverwood survey: a) Riverton, b) Triangular point, c and d) Triangular bifaces.

Of the181chert artifacts recovered, the overwhelming majority were manufactured from local Fall Creek chert. Table 10 provides a breakdown of the chert resources utilized.

Table 10
Chert Types from Riverwood Property

Chert	No.	%	Chert	No.	%
Fall Creek	174	96.13	Attica	1	0.55
Allens Creek	3	1.66	Unknown	1	0.55
Quartzite	2	1.10			

Fifty-three pieces of prehistoric pottery were recovered during the survey. The collection contained 48 grit tempered body sherds, 1 neck sherd and 4 rim sherds. The body sherds were predominantly cordmarked (n=20), but plain/smooth treatments also occurred in high quantities (n=13), while few were fabric marked (n=3). Surface treatment was not observed for 12 eroded/exfoliated body sherds. The neck sherd had a plain/smooth surface treatment and was not diagnostic of any particular Woodland time period. The four rim sherds all had plain/smooth surface treatments.

Rim forms and decorative techniques are the most diagnostic pottery attributes. One of the rims from site 12-H-1141 displays no decoration, is relatively thick (10.0

mm), has a flattened lip and a straight profile (Figure 7c). Another undecorated sherd from site 12-H-1141, has a straight profile and the lip bevels to the exterior (Figure 7e). A line just the below the lip indicates that the clay has been folded along the lip. Another rim sherd from site 12-H-1141 is decorated (Figure 7d). The rim is fairly thick at the lip (10.4 mm) and has oblique cord wrapped tool impressions along the lip. The exterior is decorated by incised oblique lines. The sherd may represent a thickened rim strip and is too small to determine any pattern to the decoration. Another decorated rim sherd recovered from site 12-H-1146 has tool impressions placed in parallel curvilinear fashion (Figure 7f). The tool impressions are triangular in shape and reminiscent of a dentate stamp. The lip is almost completely exfoliated. Two body sherds display potential decoration. One plain/smooth sherd from site 12-H-1141 appears to have a broad line or trailed line (Figure 7b). Another plain/smooth body sherd from site 12-H-753 appears to have linear cord impressions (Figure 7a). The cord is broad and does not appear to be part of a cordmarked surface treatment. The rim styles and decorative attributes are consistent with Late Woodland attributes, but do not specifically match any central Indiana pottery type descriptions. The decorated sherd from site 12-H-1141 provides the best information for temporal affiliation. The decorative style is similar to Bowen ceramics (Dorwin 1971) or the Great Lakes style ceramics of the Oliver Phase (McCullough 2000) recovered from the Bowen Site (12-Ma-61), Oliver Farm (12-Ma-1), Moffit Farm (12-H-6/46), and the Strawtown Enclosure (12-H-883)(McCullough 2000, White et al. 2002, 2003). While most of the attributes fit Late Woodland, Middle Woodland cannot be ruled out with certainty for other sherds in the collection.

Figure 7. Pottery from the Riverwood survey.

3.3.1.1.2 Historic artifacts

The historic artifacts recovered during the survey were all likely from the late 19th century through the present (Figure 8). The whiteware is undecorated and has open ended production dates beginning ca. 1820 or 1830 (Lofstrom et al. 1982, ODOT 1991:177) (Figure 8a). The glass is predominantly clear in color (n=6), but one amber colored piece was recovered (Figure 8c–i). The earliest production of clear glass appears circa 1875 and continues to the present (IMACS 1984, Newman 1970:74). Amber glass was first produced ca. 1860 and continues until the present (IMACS 1984). Metal artifacts include an unidentified, corroded piece (Figure 8l), an undergarment fastener (Figure 8k), and a 1920 penny (Figure 8j). The 1920 wheat penny represented the best chronological marker. The historic artifacts were distributed over 5 sites and do not appear to represent a substantial historic use of the property.

Figure 8. Historic artifacts from Riverwood survey.

3.3.1.2 Sites

Two sites, 12-H-185 and 12-H-753, had been previously recorded in the survey area. Site 12-H-185 was reported by Eugene O' Mahoney to Ruth Brinker in 1983, but it was apparently not investigated at that time. The site form does not state what was recovered from the site. Site 12-H-753 was recorded by a collector in 1995 and a full inventory of was found at the site was not stated on the site form. A Late Archaic or Riverton component was reported for this site. This survey revised the reported limits of these two sites. The survey also recorded 15 new archaeological sites, 12-H-1139 to 12-H-1153.

Summaries for each site are contained in Appendix D. Thirteen sites were recorded in the floodplain and four sites were encountered on the outwash terrace. Sites with pottery were mainly found on Genesee soils within the floodplain (12-H-1139, 1140, 1141, 1142, 1145, 1146 and 1149), but one site (12-H-753) that contained pottery was found on Fox soils on the outwash terrace. The Late Archaic Riverton point was found at site 12-H-1145 on Genesee soils. The Late Woodland/Prehistoric artifacts (Triangular point, Triangular bifaces, and pottery) were found at sites 12-H-1141 and 1145 on Genesee floodplain soils.

The results of the survey and the floodplain setting were important factors in making recommendations for the sites. Eleven sites were recommended for further archaeological investigations. Table 11 provides a summary of the recommendations for each site. Six sites were not considered eligible for listing on the State or National Registers and no further work was recommended. Five of the sites did not have a surface manifestation that appeared Register eligible, but were located on alluvial soils and a subsurface investigation was recommended. Six of the sites appear to be potentially eligible for listing on the State or National Registers and are located on alluvial soils. These sites were recommended for testing and subsurface reconnaissance.

Table 11
Riverwood Recommendations

Recommendation	Sites
Not significant/ not Register eligible (n=6)	12-H-185, 753, 1149, 1151, 1152, and 1153
Not significant/ Subsurface reconnaissance (n=5)	12-H-1142, 1143, 1147, 1148, and 1150
Testing/Subsurface reconnaissance (n=6)	12-H-1139, 1140, 1141, 1144, 1145, and 1146

3.3.1.3 Density

Since the survey of the Riverwood property incorporated both floodplain and outwash terrace zones, prehistoric site and artifact densities were calculated for each zone. Historic site and artifact densities were not calculated   Approximately 32 acres of floodplain and seven acres of terrace were surveyed. Thirteen sites were found on the floodplain and four were located on the terrace. One hundred eighty five prehistoric artifacts were recovered from the floodplain and 50 were found on the terrace. This survey documented one site per 4.44 acres, 12.50 prehistoric artifacts per site, and 7.14 prehistoric artifacts per acre surveyed in the terrace zone. For the floodplain, one site per 3.97 acres, 14.23 prehistoric artifacts per site, and 5.78 prehistoric artifacts per acre surveyed were documented.

3.3.2 Heritage Property

The Heritage Group property is located on the floodplain between Allisonville Road/10th Street and the White River in Section 12, Township 18 North, Range 4 East and Section 7, Township 18 North, Range 5 East as shown on the USGS 7.5' Noblesville Quadrangle (Figure 9). This field is located in the valley below a prominent oxbow bend in the White River. The river is to the north and west sides of the property. The field had been planted in soybeans and the surface visibility ranged from 50 to 90%. Approximately 43 acres of land were surveyed at this property. Permission had been obtained to also survey the field to the south (45 acres), but visibility was below 30%. The Heritage field contained Genesee and Shoals soils. Three intermittent channels or swales trending southwest-northeast occurred in the field, paralleling the White River. Two of the channels were wooded and not surveyed. Recent alluvium was observed at the northern end of the field. Ten archaeological sites were recorded in the Heritage property (Figure 10). The sites ranged in size from isolated finds to 13,992 m^2 (3.5 acres) in size. The sites with identified components were Woodland or Late Woodland in age.

Site Locations Confidential

Not for Public Disclosure

Site Locations Confidential

Not for Public Disclosure

3.3.2.1 Artifacts

A total of 430 artifacts, 4 pieces of bone and 146 fire-cracked rocks were documented by the field survey. Table 12 provides a list of the artifacts recovered by category. The definitions of prehistoric artifact classes used are contained in Appendix B. Point types were classified using Justice (1987). Prehistoric pottery and historic artifacts were classified using a variety of published references and are discussed below. Artifacts are listed by individual site in Appendix C.

Table 12
Artifacts Recovered from Heritage Property

Category	No.	Category	No.
Unmodified flakes	234	Other Chipped Stone	1
Modified flakes	56	Celt fragment	1
Bipolar	3	Pottery	64
Cores	16	Historic Ceramics	20
Bifaces	4	Glass	22
Perforator	1	Metal	2
Points	6		

3.3.2.1.1 Prehistoric Artifacts

The few diagnostic artifacts recovered by the survey were Woodland or Late Woodland/Prehistoric in age. Of the six points that were found, five were Triangular forms dating between AD 800 and Historic contact (Justice 1987:224-230) and one was a fragment of unknown age. The five Triangles were all manufactured from Fall Creek chert (Figure 11).

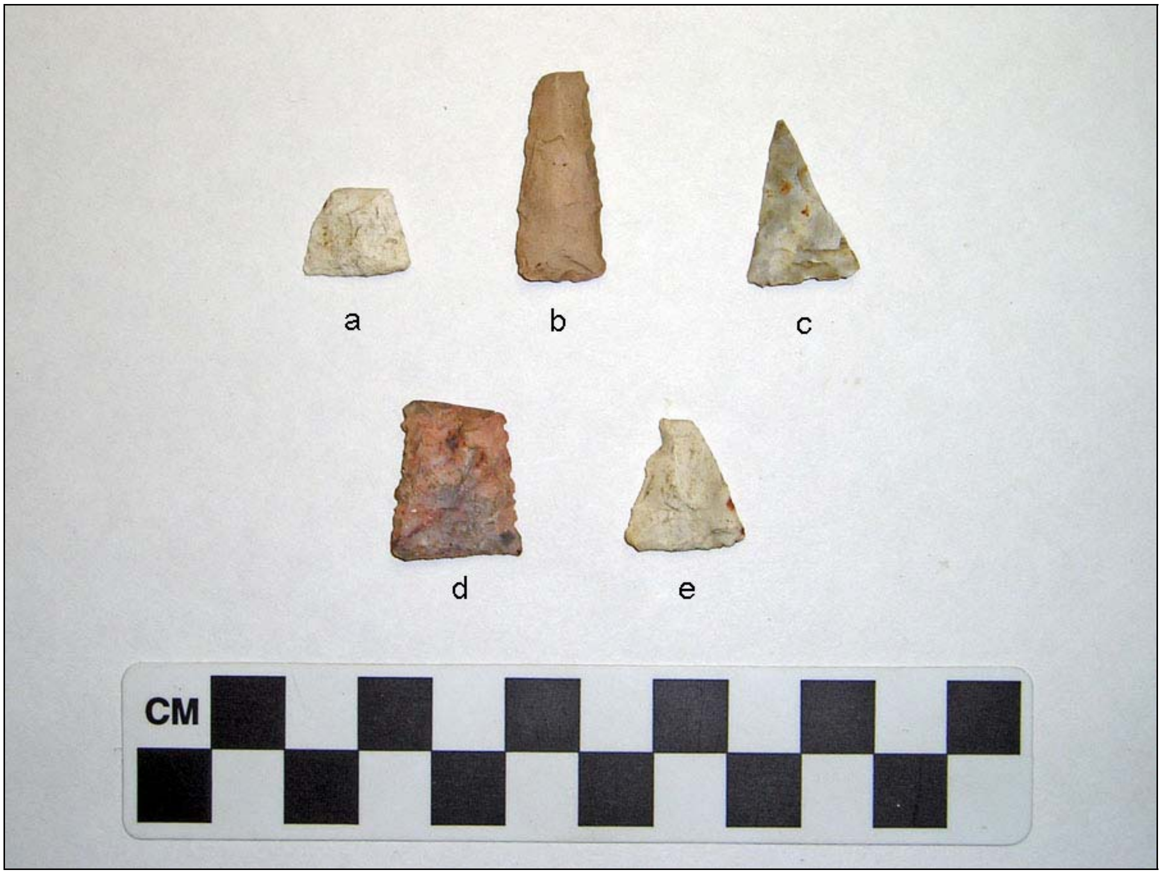

Figure 11. Points for Heritage survey.

Of the 320 chert artifacts recovered, the overwhelming majority were manufactured from local Fall Creek chert. Table 13 provides a breakdown of the chert resources utilized.

Table 13
Chert Types from Heritage Property

Chert	No.	%	Chert	No.	%
Fall Creek	313	97.81	Indian Creek	2	0.63
Allens Creek	4	1.25	Wyandotte	1	0.31

The pottery collection from the Heritage property consisted of 58 body sherds, three neck sherds and three rim sherds. Five shell tempered sherds were represented by four body sherds with eroded surfaces and one neck sherd with a plain/smooth surface. The grit tempered sherds were represented by 54 body forms (34 cordmarked, 17 eroded/exfoliated, 2 fabric marked and 1 plain/smooth), two necks (plain) and three rims (2 cordmarked and 1 eroded/exfoliated).

The diagnostic sherds for this collection were represented by the two necks and three rims. One of the necks, from site 12-H-1136, has a plain/smoothed surface and at least two broad trailed/incised lines (Figure 12b). The other neck, from site 12-H-1137, may also have a broad trailed/incised line or it may represent a transition of the surface treatment from a plain/smooth surface to a cordmarked surface (Figure 12a). The three rims are all from site 12-H-1137. One rim is cordmarked and has perpendicular tool impressions placed on the interior of the rim (Figure 12c). The rim may be wedge shaped, but it is too small to be certain. Another rim is fragmented and appears to represent a thickened rim strip, but the lip section is missing. It is cordmarked and has two parallel lines of corded impressions (Figure 12d). The third rim has an eroded surface (Figure 12e). It has at least one oblique tool impression on the top of the lip. The sherd also appears to have some form of handle or lug attachment causing the sherd to be very thick (15.0 mm). The rim styles and decorative attributes are consistent with Late Woodland attributes, but are so fragmentary that is hard to specifically match them to any central Indiana pottery type descriptions. The trailed designs of the neck sherds and the thick rim with the tentative appendage, and the rim with linear rows of cord impressions are similar to Oliver ceramics (Dorwin 1971) or the Fort Ancient style ceramics of the Oliver Phase (McCullough 2000). The other rim is similar to Albee ceramics (McCord and Cochran 1992) having the interior tool impressions. Since diagnostic sherds were fragmentary, cultural associations must remain tentative.

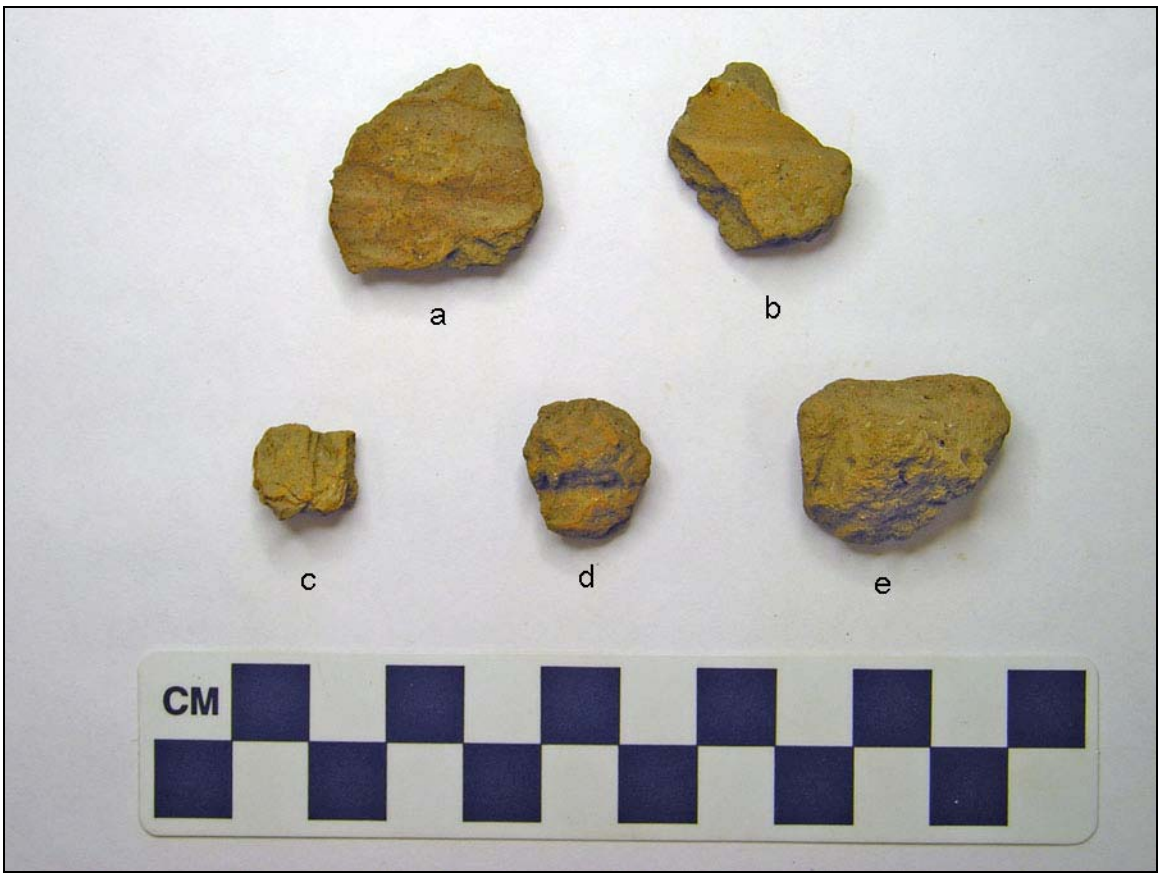

Figure 12. Pottery from Heritage survey.

3.3.2.1.2 Historic Artifacts

The historic artifacts represent a range from the early 19th century to the present. The ceramics contained 11 pieces of undecorated whiteware, six pieces of decorated whiteware and one piece of decorated stoneware, one clay pigeon fragment and one clay pipe stem (Figure 13). The decorated whitewares were represented by one blue-green glaze (Figure 13d), two with a blue band (Figure 13e-f), and one exfoliated brown transfer print (Figure 13f). One flow blue (Figure 13i) and one purple transfer print (Figure 13h) were also tentative identified, but the identifications were not certain since the pieces had been burned. The undecorated whitewares have open production dates from circa 1820 to the present (ODOT 1991: 177, Lofstrom et al. 1982:8). The two whiteware pieces with the blue band likely date to the early 1900s (Majewski and O'Brien 1987:160). The earliest whitewares were the flow blue at circa 1844-1860 (Lofstrom et al. 1991: 14), the brown print at circa 1830 – 1850 (Lofstrom et al. 1991:14) and the purple transfer print decoration at circa 1830 -1860 (Lofstrom et al. 1991:14). Unfortunately these early decorated pieces were either burned and/or exfoliated and the identification is tentative. The clay pigeon (Figure 13k) dates sometime after 1880 (Kerr 2005). The clay pipe stem has a grey paste and shows mold seams. An "X" pattern encircles the stem near the lip (Figure 13l). A similar pipe is discussed by Smith (1986:63-64) with likely dates between 1790 and 1850.

Figure 13. Historic artifacts from Heritage survey.

The glass was mainly represented by container fragments. Only one piece of clear flat glass was recovered. The function of the containers was not apparent in most cases, but 2 fragments were part of a canning jar of aqua glass. The other container fragments included seven milk, six cobalt, two amethyst, two olive/green, and two clear glass pieces. The age of the glass was derived primarily by color. Milk glass and cobalt blue glass were produced between 1890 and 1960 (IMACS 1984), amethyst glass was produced between 1880 and 1925 (Newman 1970:74), olive/green glass date from 1860 to the present (IMACS 1984), aqua glass was produced between 1800 and 1910 and clear glass from 1875 to the present (IMACS 1984).

Sites 12-H-1136 and 1137 contained approximately 61% of the historic artifacts found by the survey. Site 12-H-1137 also had a brick scatter. The earliest historic artifacts are from site 12-H-1137 and date to the early and mid 19th century. This site appears to represent an important historic use of the property.

3.3.2.2 Sites

While the Heritage property had not been systematically surveyed previously, three sites, 12-H-44, 594 and 608, had been previously recorded in the survey area. Site 12-H-44 was originally reported by Jack Householder in 1954 and resurveyed by Cree (1991). Pottery, lithics, bone and a Madison point were reported from the site. Sites 12-H-594 and 608 were discovered by Cree (1991) during a random survey to find 12-H-44. Site 12-H-594 was an unidentified prehistoric site that contained lithics and site 12-H-608 was a Woodland site that contained lithics and pottery. All of these previously recorded sites were recommended for testing. In addition to the three previously recorded sites, this survey recorded seven new archaeological sites, 12-H-1132 to 1138. Summaries for each site are contained in Appendix D.

All of the sites were located on the flood plain. All of the sites were located on well drained Genesee soils, but three sites (12-H-594, 608, and 1136) were also located on the poorly drained Shoals soils because the artifact distributions continued into floodplain swales. Prehistoric pottery was found on six of the ten sites. Ft. Ancient style Oliver pottery was tentatively identified from site 12-H-1136 and 1137 and a possible Albee Phase sherd was recovered from site 12-H-1137. Two of the Triangular points were found at site 12-H-1136 and two were also found at 12-H-1137. The remaining Triangular point was found at site 12-H-594. A previous survey (Cree 1991) found a Triangular point from site 12-H-44.

Recommendations for the sites were based on the results of the survey and the floodplain setting. Nine of the ten sites were recommended for some further archaeological investigation. Table 14 provides a summary of the recommendations made for each site. One site was not considered eligible for listing on the State or National Registers and no further work was recommended. Two of the sites did not have a surface manifestation that appeared Register eligible, but were located on alluvial soils and a subsurface investigation was recommended. Seven of the sites appear to be potentially eligible for listing on the State or National Registers and are located on alluvial soils. These sites were recommended for testing and subsurface reconnaissance.

Table 14
Heritage Recommendations

Recommendation	Sites
Not significant/ not Register eligible (n=1)	12-H-1138
Not significant/ Subsurface reconnaissance (n=2)	12-H-1134 and 1135
Testing/Subsurface reconnaissance (n=6)	12-H-44, 594, 608, 1132, 1133, 1136, and 1137

3.3.2.3 Density

The survey of the Heritage property was conducted solely in a floodplain zone. Only prehistoric site and artifact densities were calculated. Approximately 43 acres were survey and 10 sites with prehistoric components were encountered. Prehistoric artifacts recovered during the survey totaled 386. The survey documented a density of one site per 4.30 acres, 38.6 prehistoric artifacts per site and 8.98 prehistoric artifacts per acre.

3.3.3 Conner Prairie Property

Conner Prairie owns several hundred acres of land within the White River Valley. The property that was chosen for this survey is located south of 146th Street in Sections 23 and 24, Township18 North, Range 4 East as shown on the USGS 7.5' Fishers Quadrangle (Figure 14). Approximately 400 acres of Conner Prairie land was surveyed previously by Ellis (1982), but a low density of sites was recorded. Due to the large area available, and potential for new information, this property was chosen for resurvey. The property selected is located to the west of the White River above a large "horseshoe" bend and contained both flood plain and outwash terrace landforms. An artificial levee bounds the White River on the southern and eastern edges of the field. The field contained drilled beans at the time of the survey and surface visibility ranged from 60 to 75% visibility. Approximately 113 acres of land were surveyed at this property. Both the floodplain and terrace landforms were sampled and since information was redundant, no more land was surveyed at this property. The field contained Genesee and Ross soils on the floodplain and Fox, Ockley and Westland soils on the terrace. The floodplain swales tended to parallel the White River in a northeast-southwest alignment. Recent alluvium on the flood plain was not observed during the time of the survey. Twenty-one archaeological sites were recorded in this property (Figure 15). The sites ranged in size from isolated finds to artifact scatters 25,967 m^2 (6.4 acres) in size. Sites with identified components were Middle/Late Archaic, Late Archaic, Woodland, Late Woodland/Prehistoric and Historic in age.

Site Locations Confidential

Not for Public Disclosure

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3.3.3.1 Artifacts

A total of 605 artifacts were recovered and 487 fire-cracked rocks were documented during the field survey. Table 15 provides a list of the artifacts recovered by category. The definitions of prehistoric artifact classes are in Appendix B. Point types were classified using Justice (1987). Prehistoric pottery and historic artifacts were classified using a variety of published references and are discussed below. Artifacts are listed by individual site in Appendix C.

Table 15
Artifacts Recovered from Conner Prairie Property

Category	No.	Category	No.
Unmodified flakes	456	Anvil	1
Modified flakes	57	Hammerstone	1
Bipolar	6	Other Chipped Stone	6
Cores	15	Celt preform	1
Bifaces	6	Chipped slate disk	1
Perforator	2	Pottery	27
Endscraper	1	Historic Ceramics	7
Points	16	Glass	2

3.3.3.1.1 Prehistoric Artifacts

Only a few of the artifacts recovered served as temporal markers. Of the six bifaces recovered, two were technologically part of Late Woodland Triangular point manufacture. One of Triangular bifaces was manufactured from Fall Creek (12-H-1122) chert and the other was made from Indian Creek chert (12-H-1121).

The projectile points included a Middle/Late Archaic Matanzas point (12-H-1116) (3700 to 2000 BC (Justice 1987:119-121)), a Late Archaic Brewerton point (12-H-128) (3000 to 1700 BC (Justice 1987: 115-117)) and a Late Archaic Riverton point (12-H-1128) (2000 to 1000 BC (Justice 1987:130-132)) (Figure 16). Late Woodland and Late Prehistoric points included two Commissary points (12-H 128, 146, Figure 16k and 16l))(circa AD 900) (Filkins 1988:161-162) and 10 Triangular points (12-H-127, 128, 1114, 1115, 1116, and 1121) (AD 800 to contact (Justice 1987:224-230))(Figure 16). One point fragment was also recovered from site 12-H-1114. All of the points except for the fragment, were manufactured from Fall Creek chert. The point fragment was made from on unknown chert type.

Figure 16. Points from Conner Prairie survey.

The chipped slate disk from site 12-H-127 likely dates to the Late Woodland/Late Prehistoric era, though Converse (1973:40) places these artifacts in Middle and Late Woodland (Figure 17).

Figure 17. Chipped slate disc from Conner Prairie survey.

Of the 559 chert artifacts recovered, the overwhelming majority were manufactured from local Fall Creek chert. Table 16 provides a breakdown of the chert resources utilized.

Table 16
Chert Types from Conner Prairie

Chert	No.	%	Chert	No.	%
Fall Creek	541	96.78	Zaleski	2	0.36
Indian Creek	5	0.89	Upper Mercer	1	0.18
Quartzite	4	0.72	Glacial	1	0.18
Allens Creek	2	0.36	Unknown	3	0.53

Twenty-seven grit tempered pottery sherds were recovered by the survey. Only one rim sherd was recovered and unfortunately, the surface of the sherd was eroded. The rim appears to have a straight profile and flattened lip. No decorative elements were discerned. The surface treatment of the body sherds was documented as 17 cordmarked, one fabric marked, three plain/smooth and six eroded/exfoliated surfaces. No decorative techniques were noted in the ceramic assemblage and the sherds cannot be attributed to any particular Woodland period or culture.

3.3.3.1.2 Historic Artifacts

The historic artifacts were distributed over four sites that were near the farm complex on the terrace. The historic ceramics consisted of two undecorated pieces of whiteware (Figure 18a-b), three pieces of stoneware (Figure 18c-e) one piece of earthenware (Figure 18f) and a porcelain insulator fragment (Figure 18g). The glass fragments were both portions of containers and both were aqua in color. One was recognized as a canning jar fragment (Figure 18h). The historic artifacts all have a long span of production ranging from the early 19th century to the present (IMACS 1984, ODOT 1991:177, Lofstrom el al. 1982:8). The historic artifacts were few in number and appear related to the farm complex situated just outside of the survey area.

Figure 18. Historic artifacts from Conner Prairie survey.

3.3.3.2 Sites

This property was previously surveyed by Ellis (1982) and 13 archaeological sites were documented (12-H- 127, 128, 129, 130, 1331, 132, 133, 143, 145, 146, 147, 148 and 149). These sites had a range of components of unidentified prehistoric, Late Archaic, Early Woodland, Middle Woodland, and Late Woodland/Mississippian. Three of the sites, 12-H-133, 145 and 149 were recommended for testing. Site 12-H-733 was also recorded in this field during a compliance project (Feldheus 1995). This site is an isolated find of prehistoric age. Three sites, 12-H-127, 128 and 146 were rediscovered during this survey. Four sites, 12-H-143, 147, 148 and 149 had boundaries and descriptions too dissimilar to sites encountered during this project and these numbers were not used to avoid confusion. Other sites previously recorded in this field were not relocated because the entire field was not resurveyed during this project.

In addition to sites documented by Ellis (1982), Conner Prairie posses a circa 1935 map by Ed Conner indicating an Indian village within the southern end of the survey area (Crumrin 1998). This village location is near site 12-H-145 recorded by Ellis (1982) as a buried historic midden deposit that was recommended for subsurface testing. A Delaware Village known as Upper Delaware Town was reported across the river from

Conner's Town (Thompson 1937:203-204, McCord 2002:87-91). This would potentially place the village in the survey area.

Summaries for each of the sites encountered during this survey are in Appendix D. Sixteen sites were encountered in the floodplain and five sites were found on the terrace. Sites with pottery (12-H-127, 146, 1113, 1114, 1116, 1118, 1121, 1122) were mainly found on floodplain soils, but one site (12-H-1118) also encompassed the outwash terrace. The Brewerton point and the Riverton point were from sites on the terrace. The Matanzas point was found on the flood plain. One of the Commissary points was found on the terrace and the other was found on the flood plain. Seven of the Triangular points and the two Triangular bifaces were recovered from the floodplain. Two of the Triangular points were found on the terrace and one Triangular point was from a site the overlapped both the floodplain and outwash terrace.

Recommendations for the sites were based on the results of the survey and the geomorphic setting. Of the 21 sites recorded, 15 were recommended for further archaeological investigations. Table 17 provides a summary of the recommendations for each site. Six sites were not considered eligible for listing on the State or National Registers and no further work was recommended. Fifteen of the sites appear to be potentially eligible for listing on the State or National Registers and are located on alluvial soils. These sites were recommended for testing and subsurface reconnaissance.

Table 17
Conner Prairie Recommendations

Recommendation	Sites
Not significant/ not Register eligible (n=6)	12-H-1119, 1127, 1128, 1129, 1130 and 1131
Testing/Subsurface reconnaissance (n=15)	12-H-127, 128, 146, 1113, 1114, 1115, 1116, 1117, 1118, 1120, 1121, 1122, 1123, 1124, and 1126

3.3.3.3 Density

Since the survey incorporated both floodplain and outwash terrace zones, prehistoric site and artifact densities were calculated for each zone. Historic site and artifact densities were not calculated. Approximately 80 acres of floodplain and 33 acres of terrace were surveyed. Sixteen sites with prehistoric components were found on the floodplain and five were located on the terrace. Prehistoric artifacts recovered from the floodplain totaled 584, while 12 artifacts were found on the terrace. This survey documented one prehistoric site per 5.00 acres, 36.50 prehistoric artifacts per site, and 7.30 prehistoric artifacts per acre in the floodplain. For the terrace, one prehistoric site per 6.60 acres, 2.40 prehistoric artifacts per site, and 0.36 artifacts per acre surveyed were documented.

3.4 Summary/Discussion

The archaeological survey documented 40 new and 8 previously recorded sites and over 1200 artifacts. Diagnostic artifacts ranged in age from the Middle/Late Archaic (3700 BC) to Historic (late 20th century) artifacts. The results of this survey were similar to surveys recently conducted within the Upper White River Valley at Koteewi Park (McCord and Cochran 2003a, White et al. 2003) and other larger surveys in the valley (Ellis 1982, Conover 1988, Hixon 1988, Cree 1991, Carmany 2002).

The Late Woodland/Prehistoric era dominated the temporally diagnostic artifacts recovered during the survey. The Late Woodland/Prehistoric artifacts were mainly encountered on the valley floor, but the survey was primarily conducted on the floodplain. Late Woodland/Prehistoric components tend to dominated valley settings in the White River (Ellis 1982, Conover 1988, Hixon 1988, Cree 1991, Carmany 2002, McCord and Cochran 2003a, White et al. 2003). Late Archaic was the next most frequent era represented in this survey. The Late Archaic artifacts occurred in both the valley and outwash terrace. From the regional data (Ellis 1982, Hixon 1988, Cree 1991, Carmany 2002, McCord and Cochran 2003a, White et al. 2003), there seems to be variation in settlement patterns during this period. While Riverton or Merom points are found in both settings, Matanzas points are more frequently found on the valley floor than along the outwash terraces. Middle Woodland components were absent in this survey. The Strawtown area appears to have an unusually high frequency of Middle Woodland artifacts (McCord and Cochran 2003a:124-125). No Paleoindian or Early Woodland sites were recorded during this survey. No Paleoindian components have been documented on the valley floor of the Upper White River Valley, but do occur at the valley margins on outwash terraces (Ellis 1982, Conover 1988, Hixon 1988, Cree 1991, Carmany 2002, McCord and Cochran 2003a, White et al. 2003). A few Early Woodland sites have been documented on the valley floor and outwash terrace, but in very low numbers (Ellis 1982, Conover 1988, Hixon 1988, Cree 1991, Carmany 2002, McCord and Cochran 2003a, White et al. 2003).

Site and artifacts densities were also compared with the regional information. Table 18 provides a summary of density information gathered during this project and Table 19 show the regional density figures (Ellis 1982, Hixon 1988, Cree 1991, Carmany 2002, McCord and Cochran 2003a, White et al. 2003).

Table 18 Site and Artifact Density						
Area	Acres Surveyed	No. of Sites	Total Prehistoric Artifacts	Site Density (site/acre)	Arifacts per Site	Artifacts per Acre
Riverwood Valley	32	13	185	3.97	14.23	5.78
Heritage Valley	43	10	386	4.30	38.6	8.98
Conner Prairie Valley	80	16	584	5.00	36.5	7.30
Valley Total	155	39	1155	3.97	29.6	7.45
Riverwood Terrace	7	4	50	4.44	12.5	7.14
Conner Prairie Terrace	33	5	12	6.60	2.40	0.36
Terrace Total	40	9	62	4.44	6.89	1.55

Table 19 Regional Site and Artifact Density						
Area	Acres Surveyed	No. of Sites	Total Prehistoric Artifacts	Site Density (site/acre)	Arifacts per Site	Artifacts per Acre
McCord and Cochran Valley	276	53	1812	4.76	34.18	6.57
White et al. Valley*	129	35	1099	3.70	31.4	8.52
Carmany Valley^	124	13	557	9.54	42.8	4.49
Cree Valley	8	4	11	2.00	2.75	1.37
Hixon Valley	345	35	1551	9.86	44.31	4.49
Ellis Valley	400	27	570	14.8	21.1	1.42
Valley Total	1282	167	5600	7.68	33.50	4.37
McCord and Cochran Terrace	87	30	475	2.90	15.83	5.46
White et al. Terrace*	14	7	680	2.00	113.3	48.57
Cree Terrace	152	69	787	2.21	11.4	5.16
Hixon Terrace	210	69	423	3.05	6.13	2.01
Terrace Total	463	175	2365	2.65	13.5	5.11
*Intensive survey data removed ^ Survey utilized shovel probes						

While this survey found on average a higher density of sites and a higher density of artifacts per acre for valley settings, there was a lower density of sites, artifacts per site and artifacts per acre when compared to the average regional data. However, as Table 19 demonstrates this survey fell within the range of regional density figures. Site and artifact densities are variable to due to survey conditions, survey interval, survey methods, crew experience, crew attitude, etc. Density information can be useful in constructing predictive models, but the biases of the data must be recognized.

3.5 Floodplain model

We know that the valley of the White River is complex and variable. Outwash terraces may vary physiographically from broad, nearly flat plains to areas cut by erosional meltwater channels leaving sloping gravelly knolls and ridges. The flood plain areas are also variable and contain areas of water margin, insular and point bars, cutbanks, backwater pockets, the flood plain proper, flood plain depressions and recent river terraces. The alluvial nature of the floodplain soils dominated by the different aged Genesee and Ross soils, may have buried previous occupations in alluvium. The White River floodplain is dominated by Late Woodland/Prehistoric occupations, but Late Archaic components are also found with some frequency on the flood plains. Early Archaic artifacts suggest that portions of the White River floodplain have been stable for several thousand years while the paucity of Early Woodland sites in the floodplain suggests the potential for sites to be buried.

With over 1300 acres of flood plain or valley floor having been surveyed in the Upper White River Valley, an idea of prehistoric utilization of the floodplain can be characterized. We expect to find one site per every 4 acres as suggested by this survey and most recent surveys using similar survey methods (McCord and Cochran 2003a, White et al. 2003). The sites will range from isolated finds, to larger sites of ca. 3 acres, to very large 40+ acre sites. The sites will most often be encountered on floodplain rises. We expect most of the sites will be unidentified Prehistoric in age. Late Woodland/Prehistoric artifacts are most common when diagnostic artifacts are recovered. Late Archaic, Middle Woodland, and Early Archaic use of the floodplain is also documented but in lower frequency. Early Woodland use of the floodplain is quite rare. Paleoindian use of the valley floor is not expected. Pottery is expected to occur in floodplain settings and in low frequency on adjacent terrace areas.

While the survey data for the Upper White River floodplain is beginning to be redundant, excavation data with context is lacking. The few sites in the region that have been tested contain considerable and important data on prehistoric lifeways. While we may now have a better understanding of where sites are and how old they may be, we know very little about what people were doing at these floodplain sites. Due to the alluvial nature of the soils, sites found in the White River Valley may contain the best context anywhere in east or central Indiana. Urban growth and mineral extraction will continue to negatively impact the archaeological resources contained within the Upper White River Valley.

4.0 TESTING AT SITE 12-H-993

4.1 Introduction

Site 12-H-993 is located on the floodplain at Koteewi Park near Strawtown, Hamilton County, Indiana (Figure 19). The site was recorded in 2002 as covering approximately 42.5 acres (McCord and Cochran 2003a). The site is multicomponent and diagnostic artifacts from the Late Archaic, Middle Woodland, LateWoodland/Prehistoric and Historic periods. Pottery recovered from the surface was related to the Albee and Oliver Phases. A geoarchaeological survey of a portion of Koteewi Park by the Indiana State University Anthropology encountered two Late Woodland/Prehistoric pit features within site 12-H-993 (Cantin et al. 2003). The features contained pottery, lithics, faunal and floral remains. A radiocarbon date of 630 +/- 60 BP was obtained from one of the features (Cantin et al. 2003).

Since part of this site was threatened by the planned construction of a recreational lake, Albee ceramics were collected from the surface, and the site had the potential to contain sub-plowzone cultural deposits, it was selected for test excavations. The area investigated during the project is on the central southeastern portion of the site previously recorded as Area F, an area approximately 1.25 acres in size. This area had a higher density of artifacts than the remainder of the site surface as recorded during the initial survey. The investigation was at the eastern border of the site that is defined by a floodplain swale.

4.2 Methods

Investigations of 12-H-993 were concentrated on the central southeastern portion of the site previously recorded as Area F, an area approximately 1.25 acres in size (Figure 20)(McCord and Cochran 2003a). A controlled surface collection and gradiometer survey of this area were initially undertaken to delimit artifact concentrations and potential sub-plowzone features. Testing of the site was then undertaken through a combination of hand excavated units and backhoe stripping of the plowzone.

The controlled surface collection was conducted on a two meter grid utilizing three 20 m x 20 m blocks (Figure 21). The grid was aligned to the axis of an adjacent swale and therefore directions refer to grid alignment not magnetic alignment unless otherwise noted. The total grid measured 20 meters east-west and 60 meters north-south creating 300 collection squares. All artifacts and fire-cracked rocks were collected from each 2 m^2 block in a 5 minute timed sample and bagged by provenience.

Site Locations Confidential

Not for Public Disclosure

Site Locations Confidential

Not for Public Disclosure

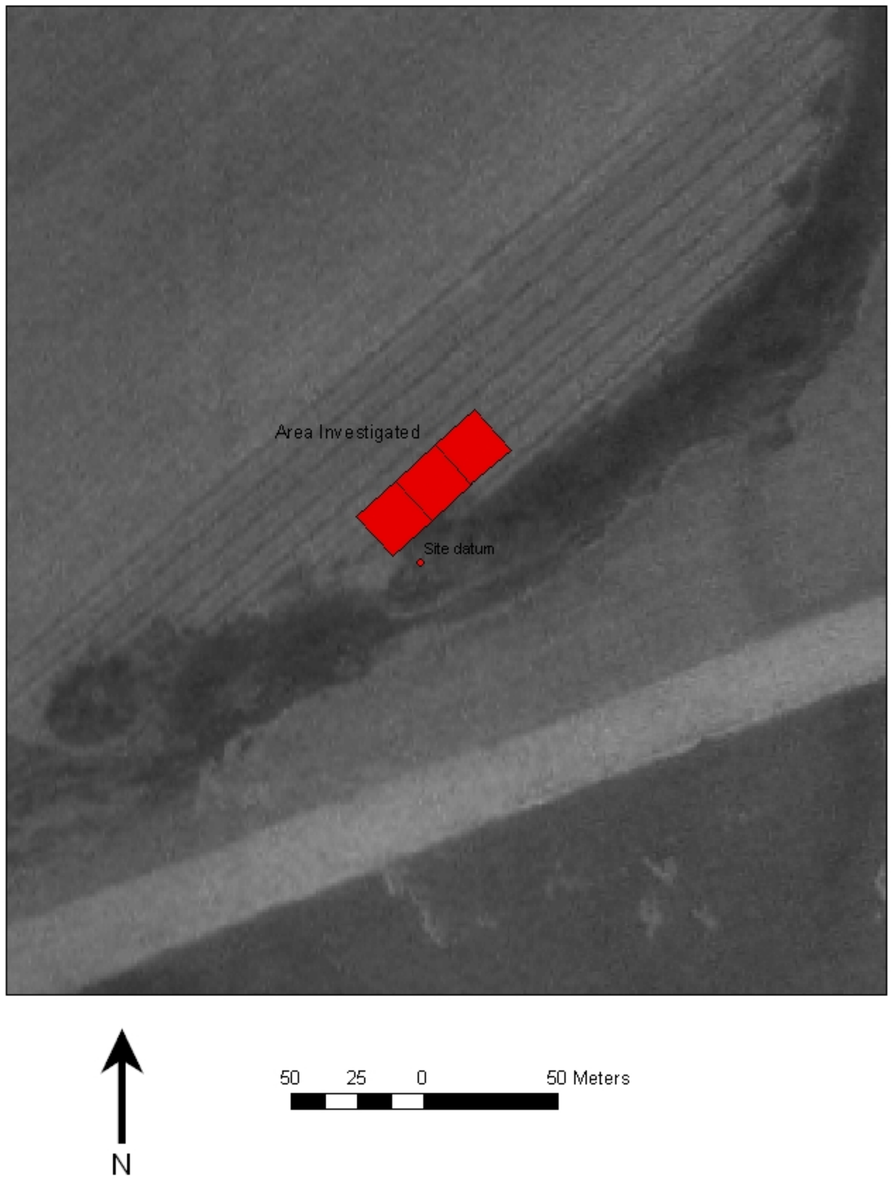

Figure 3. Area of site 12-H-993 investigated.

The gradiometer survey was conducted over the same three blocks in the 20 m x 60 m area. A Fluxgate FM36 gradiometer was used for the scan with the resolution set to 1nT. Parallel transects spaced at one meter intervals were walked going west. Readings were taken along the transect line every 0.5 meters using the external encoder trigger. The data collect was then processed using GeoPlot 3.0 software. The processing is further described under the results section.

Three auger tests were excavated within the area investigated. The augers were used to sample subsurface sediments and determine if sub-plowzone deposits exist. A 10 cm diameter bucket auger was used to recover the sediment. The augers were excavated in 10 cm lifts that were bagged separately and taken to the ARMS lab for processing. The locations of the augers were recorded by GPS. The sediments recovered from the auger tests were described by Munsell color and texture and were water screened through 1.0 mm wire mesh. The samples were then examined macro- and microscopically to recover any artifacts present.

The limited test excavation of the site utilized the same grid. The southwest corner of the three blocks was designated as grid 0N0E. Unit designations were then given a northern and eastern label. The testing began with the placement of six – 1 x 1 m units to test anomalies recorded during the gradiometer survey. The plowzone was excavated as one level and all excavated soil was screened through 6.4 mm mesh. Cultural features were discovered at the base of the plowzone in four of the units. The units were then expanded to expose the feature. The plowzone was not screened during the expansion. Three other 1 x 1 m units were placed in an area without an anomaly. These units were excavated to sterile deposits in 10 cm arbitrary levels. Upon completion of the units, at least one unit wall representative of the soil strata was profiled.

Three areas were stripped with a backhoe to the base of the plowzone. The mechanically stripped areas were placed in locations with and without magnetic anomalies. The floors of the trenches were shovel and trowel scraped as necessary to clarify deposits. If cultural features extended beyond the trench boundaries, the plowzone was removed by shovel without screening the soil to expose the full extent of the feature. Eight cultural features were identified in the backhoe trenches and subsequent expansion.

Of the 12 cultural features identified in the units or features, nine were selected for excavation. The features were mapped in plan view and bisected. The east half was excavated in 10 cm levels and the soil was screened through 6.4 mm mesh. Once the bottom of the feature was defined, a profile of the feature fill was drawn. The second half (west half) of the feature was excavated in 10 cm levels and all feature fill was bagged for flotation or fine screening.

Level and feature forms were filled out as appropriate. Notes were maintained by all crew members. Diagnostic artifacts were mapped *in situ* and individually bagged. Non-diagnostic artifacts were provenienced by unit, level and/or feature. Samples appropriate for radiocarbon dating were collected. Fire-cracked rock outside of feature context were counted and weighed by level and discarded in the field. Fire-cracked rock encountered during the excavation of the east half of the features was counted and discarded in the field. The project was documented by digital photographs and color slides.

The locations of the excavation grid, units, trenches and features were recorded with a Sokkia Axis[3] GPS using the 1983 NAD datum. A temporary site datum was established at UTM coordinates E 588407.38, N 4441965.96 for reference during the project. Excavation and feature locations were also recorded from this datum using a Sokkia total station with a SDR33 fieldbook. At the completion of the project, a permanent datum was established in the wooded area in the swale west of the site and outside the cultivated area. A piece of rebar was driven into the ground and about 5 cm was left above the surface. This datum was located at E 588418.95, N 4441932.03.

Upon completion of the excavation, all units and features were lined with plastic. Features that were encountered, but not excavated were also covered with plastic. The excavation was then backfilled.

All artifacts and samples were taken to the ARMS laboratory for processing, identification, analysis and temporary curation. Flotation samples were processed with a Flote-Tech flotation tank. The heavy fraction was collected with 2 mm mesh and light fraction was caught by 0.4 mm mesh. Since the sediment was hard to disperse, the heavy fraction underwent a second flot process. The heavy fraction was placed in 1 mm wire geologic screen and submersed in water. The sediment was agitated by hand. Wood charcoal or other light particular were scooped out of the water with a hand sieve. Fine screened samples were water screened through 3.2 mm mesh. All samples were air dried and the heavy fraction was hand sorted macroscopically and microscopically (65 to 400X). Artifacts were separated by category and catalogued.

Several samples were submitted to specialists was analysis. Samples of faunal material were submitted to Dr. Tanya Peres of the University of Kentucky, Program for Archaeological Research. Flotation samples were also sent to Dr. Leslie Bush of Macrobotanical Analysis for floral analysis. The floral and faunal samples were selected from midden deposits encountered in the pit features. There were no stratigraphic differences detected in the midden. The samples submitted for the faunal analysis were from upper, middle and lower levels of the midden deposit. The samples submitted for floral analysis were from middle levels of the midden deposit. Four samples were submitted to Beta Analytic, Inc. for radiocarbon dating. Three of the samples were selected from wood charcoal found underlying a layer of fire-cracked rock at the bottom of the features. The fourth sample was selected from a corn cob fragment found in the midden near the bottom of the feature. The carbon samples were oven dried, picked for carbon, weighed and repacked in clean foil prior to submission

Artifacts were cleaned, classified and catalogued. Definitions used for classifying prehistoric lithic materials were included in Appendix B. Metrical attributes and raw material identification were recorded as appropriate. Lithic raw materials were identified by comparison with reference samples and published descriptions on file in the ARMS laboratory. Prehistoric ceramics were compared with published sources in the region. Notes, standardized forms, maps and photographs were reviewed and prepared for illustration and curation. A DHPA Sites and Structures Inventory form was revised for site 12-H-993. All materials generated by this project were catalogued under ARMS accession # 04.50. Artifacts will be curated at the Taylor Center in Koteewi Park and maintained by Hamilton County Parks and Recreation.

4.3 Results

4.3.1 Controlled Surface Collection

A total of 300 - two x two meter collection squares were established on the central southeastern portion of site 12-H-993 (Figure 22). The collection grid encompassed the entire area investigated during this project, but represents less than 1% of the total surface distribution recorded for site 12-H-993. The controlled surface collection recovered a number of lithic and ceramic artifacts and numerous fire-cracked rocks. The surface visibility at the time of the collection ranged between 15 and 40%. Crop debris was the major factor limiting visibility.

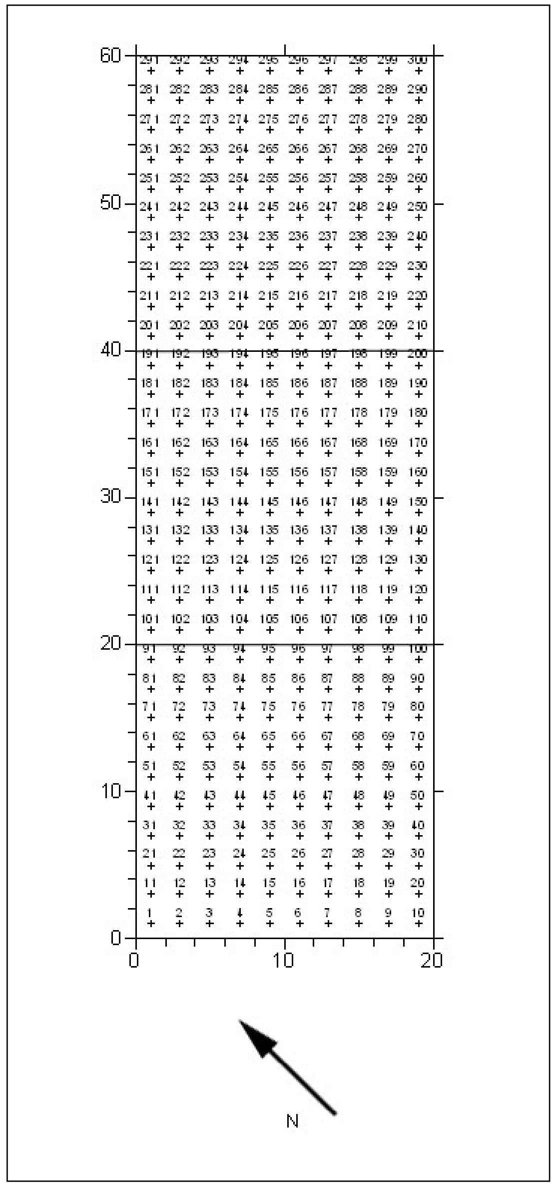

Figure 22. Controlled surface collection grid.

4.3.1.1 Artifacts

A total of 263 prehistoric artifacts, 372 fire-cracked rock, two historic artifacts, one bone and one chert sample were recovered (Table 20). A complete listing of artifacts by collection block is contained in Appendix E.

Table 20
Material from the Controlled Surface Collection

Artifact	No.	Artifact	No.
Unmodified flake	112	Neck sherd	1
Modified flake	25	Body sherd	109
Core	3	Clear glass bottle frag	1
Bipolar artifact	2	Metal, unidentified	1
Biface, stage 2	1	Bone	1
Biface, Triangular	1	Fall Creek chert sample	1
Triangular point	2	Fire-cracked rock	372
Rim sherd	4		(27.2 Kg)

The dominant material type utilized in the lithics artifacts was Fall Creek chert. Fall Creek represents 91.8% of the assemblage, Quartzite 6.2%, unknown cherts 1.4% and Allen's Creek 0.7%.

Diagnostic artifacts included two Triangular points and one Triangular biface (Figure 23). Each of these artifacts was manufactured from Fall Creek chert. One Triangular point and the Triangular biface were recovered in Block 188 and the other Triangular point was found in Block 280. The Triangular points indicate a Late Woodland/Late Prehistoric use of the site and can range in age from AD 800 to Historic contact (Justice 1987:224-230). A Middle Woodland bladelet was recovered from the 2002 survey of this area of the site (12-H-993f) (McCord and Cochran 2003a), but no artifacts from this time period were recovered during this project.

Figure 23. Points from controlled surface collection.

The pottery recovered during the surface collection was all grit tempered and appeared to fit with Late Woodland/Prehistoric styles found in the area. Most of the ceramics were body sherds. Since the sherds were found on the surface, many showed the affects of weathering and 63 were exfoliated or had eroded surfaces. The other body sherds displayed cordmarked (n=39), plain (n=4), and fabric marked (n=3) surfaces. The only neck sherd recovered was cordmarked and undecorated. Of the four rims recovered, three had plain surfaces and one had a cordmarked surface (Figure 24). The three plain rims were all decorated. One had oblique tool impressions; one had thin (incised), oblique tool impressions and one had a cord or knot impression. The decorative styles are similar to Bowen series ceramics (Dorwin 1971) and those recovered previously from site 12-H-993 (McCord and Cochran 2003a, Cantin et al. 2003).

Figure 24. Pottery from controlled surface collection.

4.3.1.2 Density

The overall artifact density recorded from the controlled surface collection was one artifact per 4.58 m^2. The fire-cracked rock density was one fire-cracked rock per 3.23 m^2.

The data from the controlled surface collection was spatially analyzed using Surfer 8.0. Figures 25 – 28 show the distribution of lithic, ceramic, lithic and ceramic artifacts combined, and fire-cracked rocks recovered by count. The highest density of artifacts recovered occurred along the western edge of the collection grid and the central area (Figure 27). The fire-cracked rock followed a similar distribution (Figure 28). Pottery was more concentrated in the central area of the grid (Figure 26).

4.3.1.3 Summary

Areas with higher frequencies of artifacts and fire-cracked rocks may indicate locations where subsurface deposits have been plowed-out. The higher concentrations may also be reflective of student abilities to detect artifacts and fire-cracked rock. The surface visibility was also variable and may have affected the distribution of artifacts and fire-cracked rock. A correlation of the higher density of artifacts, specifically pottery, near the central portion of grid with magnetic anomalies and aboriginal features does occur (see section 4.3.2).

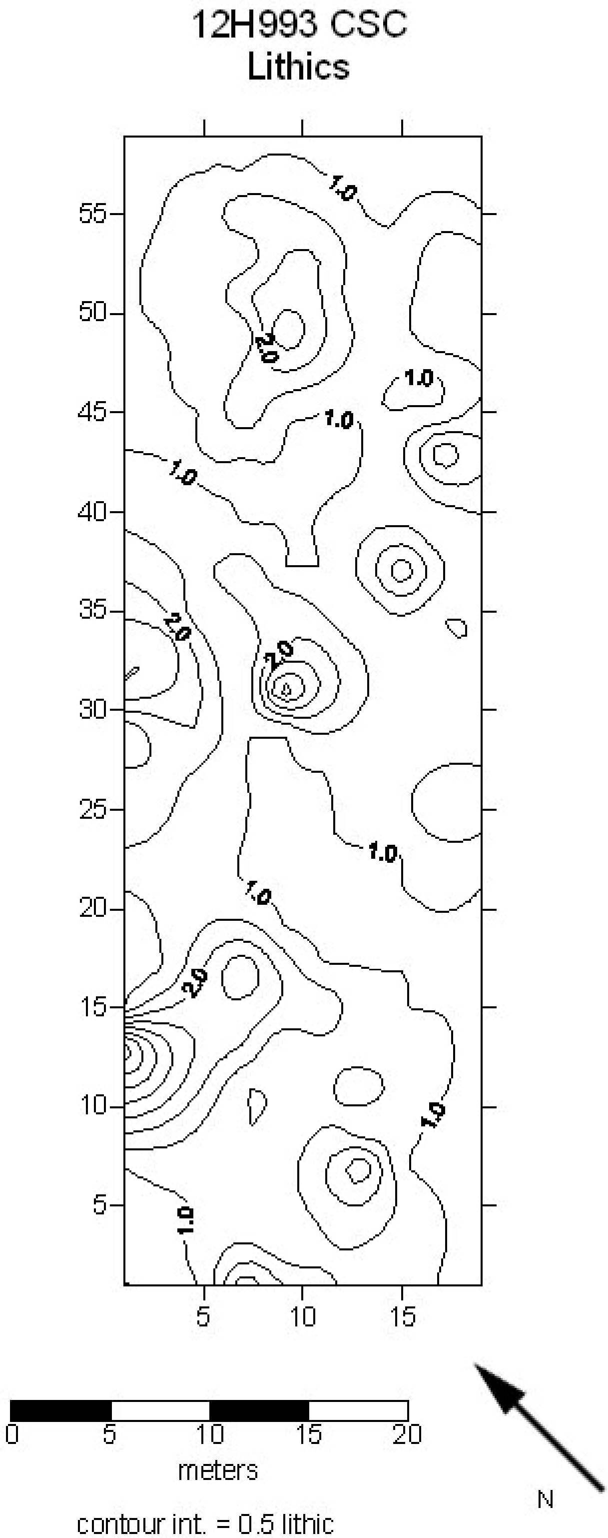

Figure 25. Density of lithics from controlled surface collection.

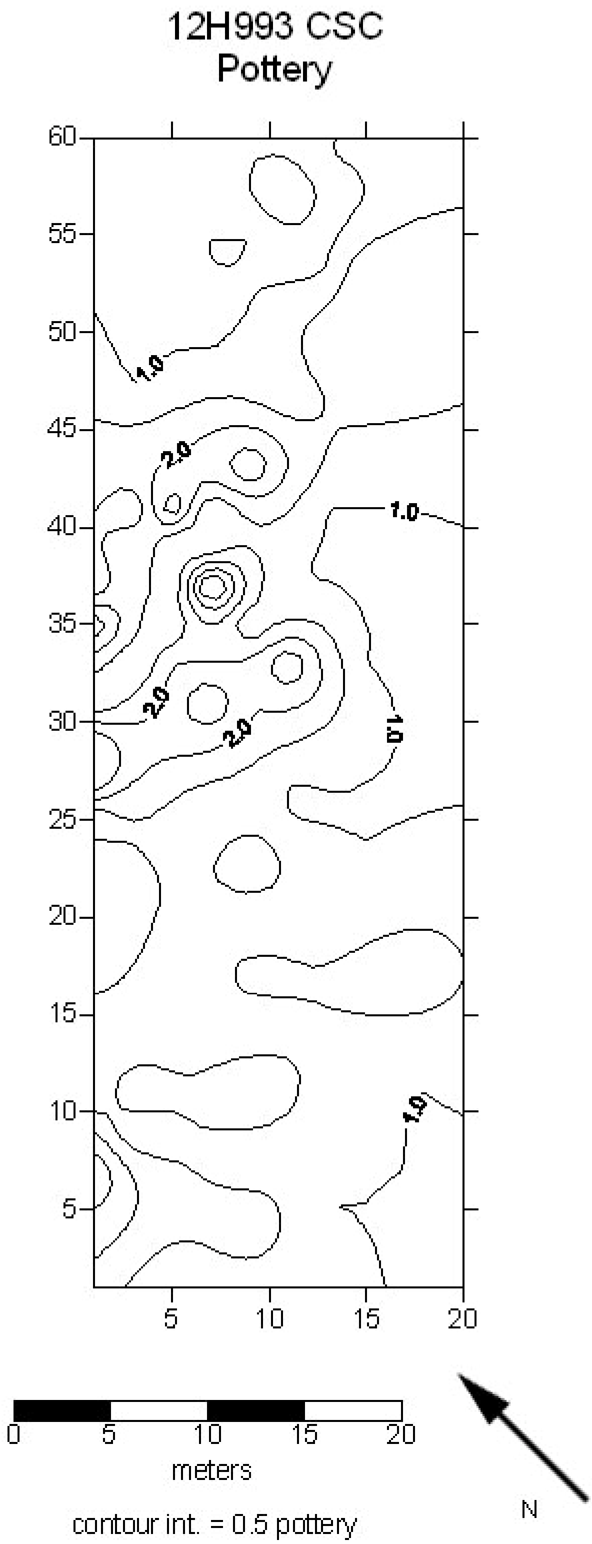

Figure 26. Density of pottery from controlled surface collection

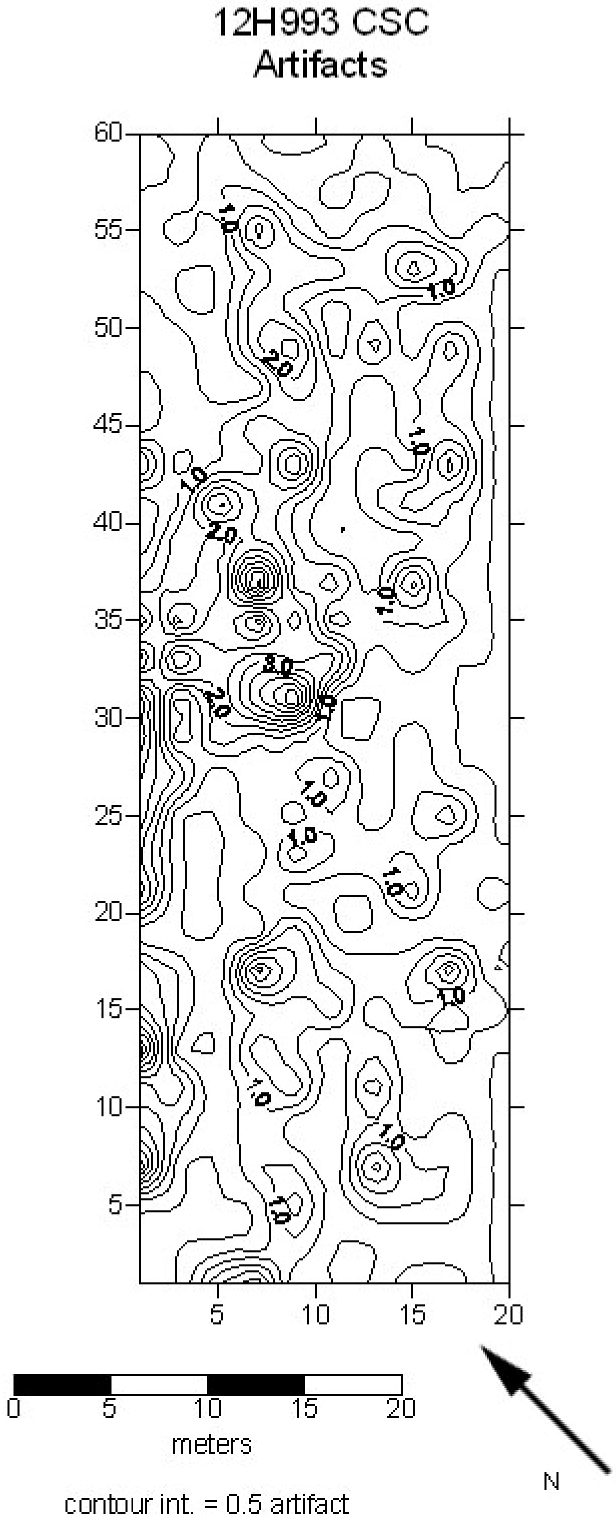

Figure 27. Density of lithics and pottery combined from controlled surface collection.

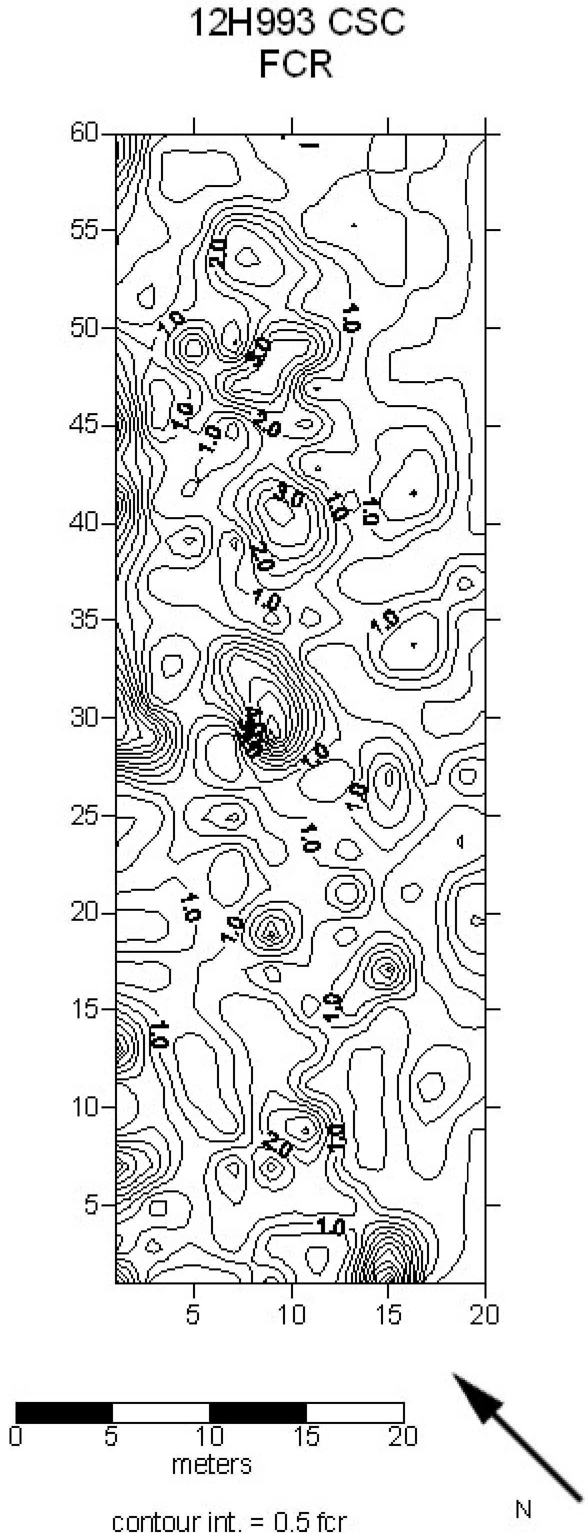

Figure 28. Density of fire-cracked rock from controlled surface collection.

4.3.2 Gradiometer Survey

After the gradiometer survey was completed, the data was downloaded to GeoPlot 3.0 software. The three grids (20 x 20m blocks) were converted to a composite file for processing. The unprocessed composite is shown in Figure 29 and the statistics for the survey are given in Table 21. Several strong positive anomalies were observed in the unprocessed data. The data was processed several ways to obtain the best interpretation of the data.

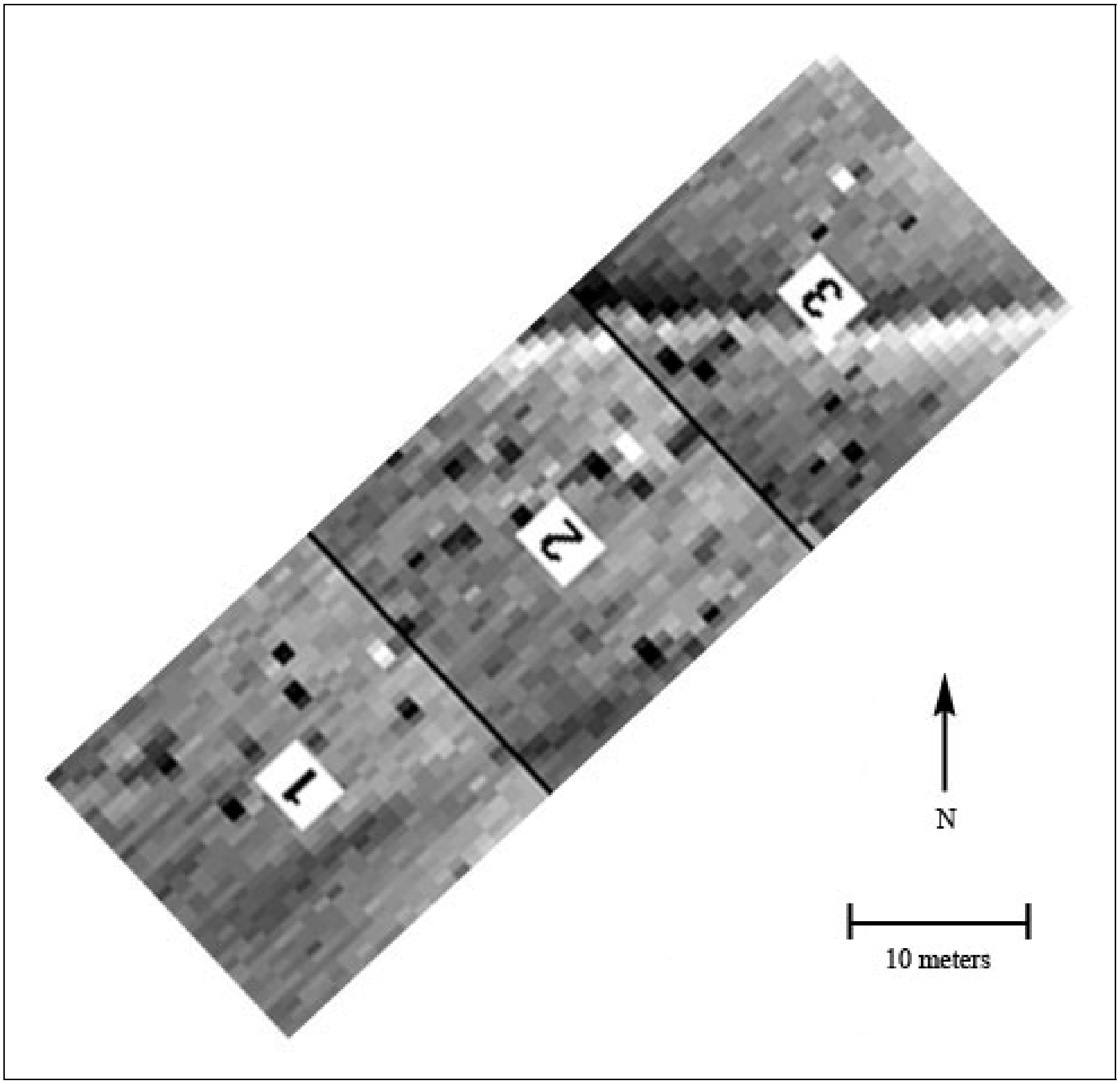

Figure29. Unprocessed gradiometer survey.

Table 21 Gradiometer Data Statistics	
Statistics	Reading
Mean	5.395208
SD	2.53631
3SD	7.608929
Minimum	-16.84211
Maximum	21.39474
Readings	2400
Dummy Value	2047.5
Dummies	0

4.3.2.1 Data Processing

To be of use in planning the excavations at site 12-H-993, the data was quickly processed looking for the strongest magnetic anomalies. The data was "clipped" at minimum -25 and maximum 25 to leave all magnetic anomalies. To match the three grids, "zero mean transverse" and "zero mean grid" with the threshold at 0.5 was utilized. Data was "despiked" to remove any surface metals. A "low pass filter" was run and both X and Y axes were "interpolated" to smooth and strengthen the presentation of the data. Figure 30 shows the processed data. At least 25 black circular anomalies approximately 1 to 1.5 meters in diameter were thought to be cultural in origin. These anomalies all had strong (at least +10) signatures. Two linear anomalies, a strongly bipolar diagonal line at the northern end of the grid and a more diffuse line at the eastern edge of the grid also warranted further investigation. The anomalies identified during this processing were sampled by hand excavated units and backhoe trenching to the base of the plow zone.

The data was reprocessed at the conclusion of the field work to look for more subtle variances in the gradiometer data. One feature, Feature 8, was not detected by the original data processing. Since the feature contained a large quantity of pottery, it was felt the gradiometer should have detected the feature. The data was also checked to ensure that the bipolar linear anomaly was not the result of user error.

The best results achieved in reprocessing the data involved "clipping" the data at a minimum -12.5 and maximum 12.5. This range was a standard deviation of +/- 5 of the mean. "Zero mean traverse" of all grids and "zero mean grid" with the threshold of 0.25 was done match the grids, although there remained some difference along the boundary of grids 2 and 3. A "low pass filter" was applied and the X and Y axes were "interpolated" to smooth the appearance. Figure 31 shows the reprocessed data. More circular anomalies, at least 30, were apparent in the reprocessed data.

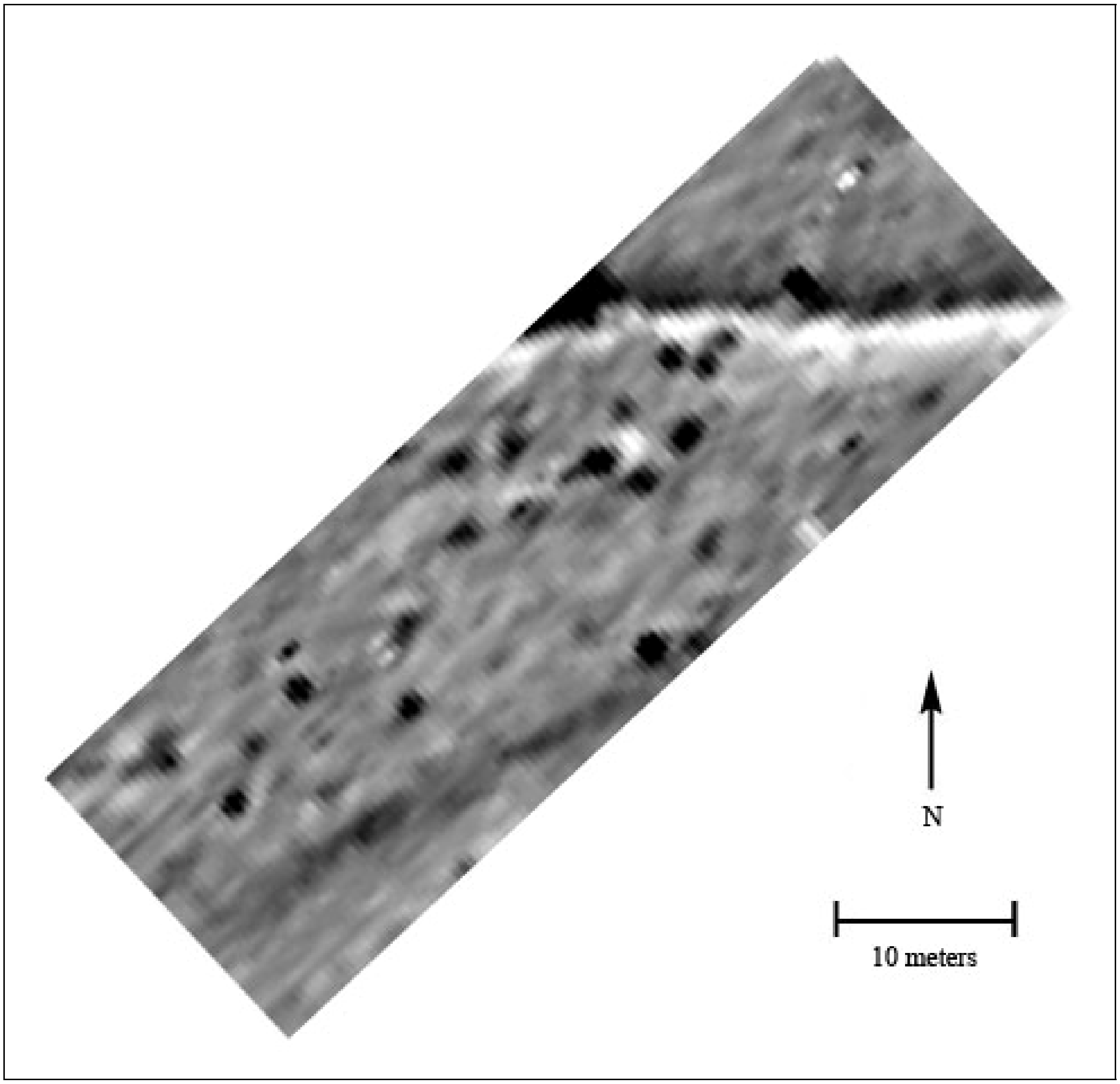

Figure 30. Original processed gradiometer survey.

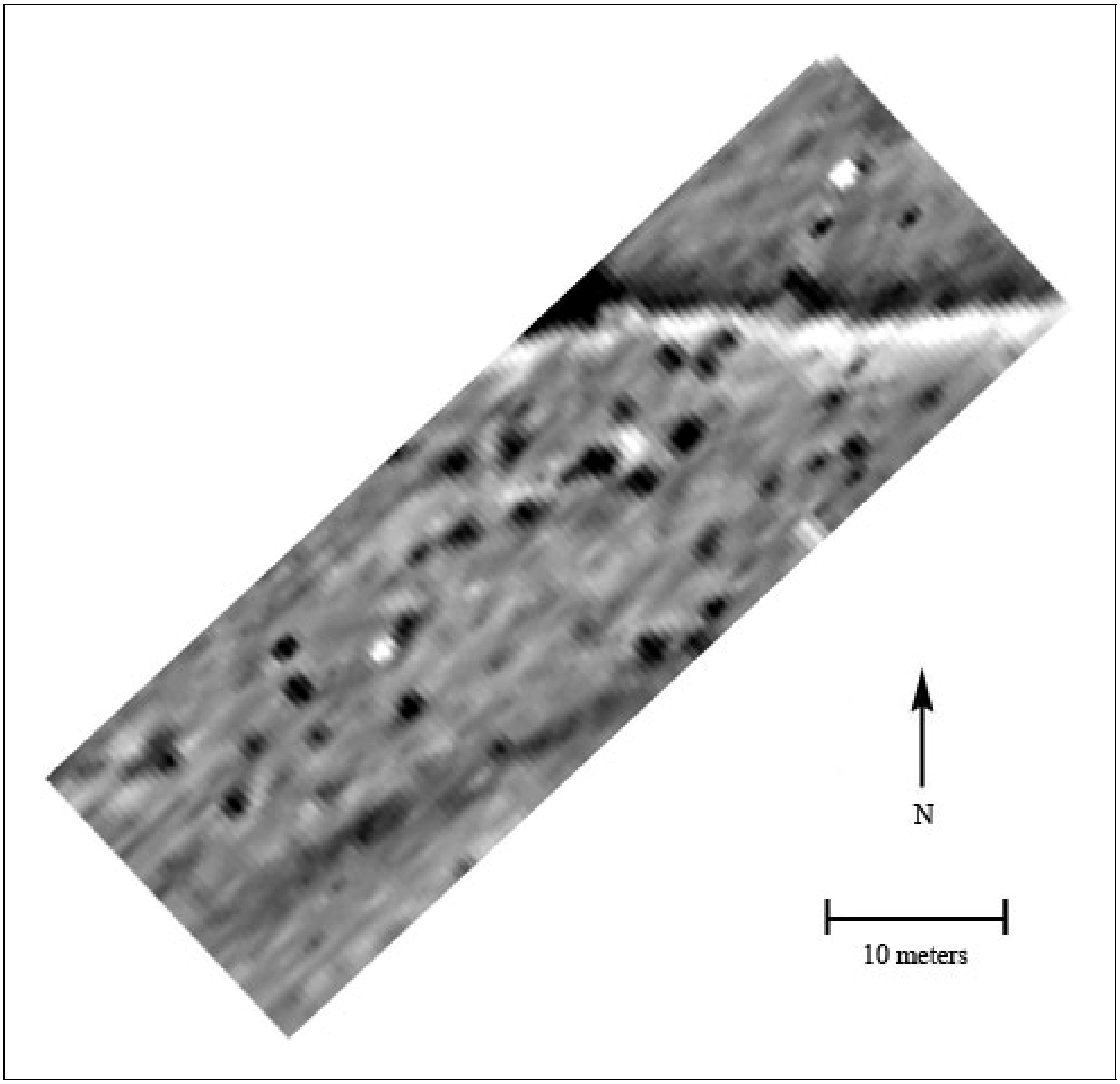

Figure 31. Reprocessed gradiometer survey.

4.3.2.2 Results

In every instance when areas that contained circular anomalies were tested by the excavation of units or backhoe trenches, a large aboriginal pit feature was discovered. The magnetic signatures were likely detected because of large quantities of fire-cracked rock found in the features. Figure 32 shows the location of cultural features found in relation to the gradiometer data. A more comprehensive description of the features detected and gradiometer is discussed in later sections.

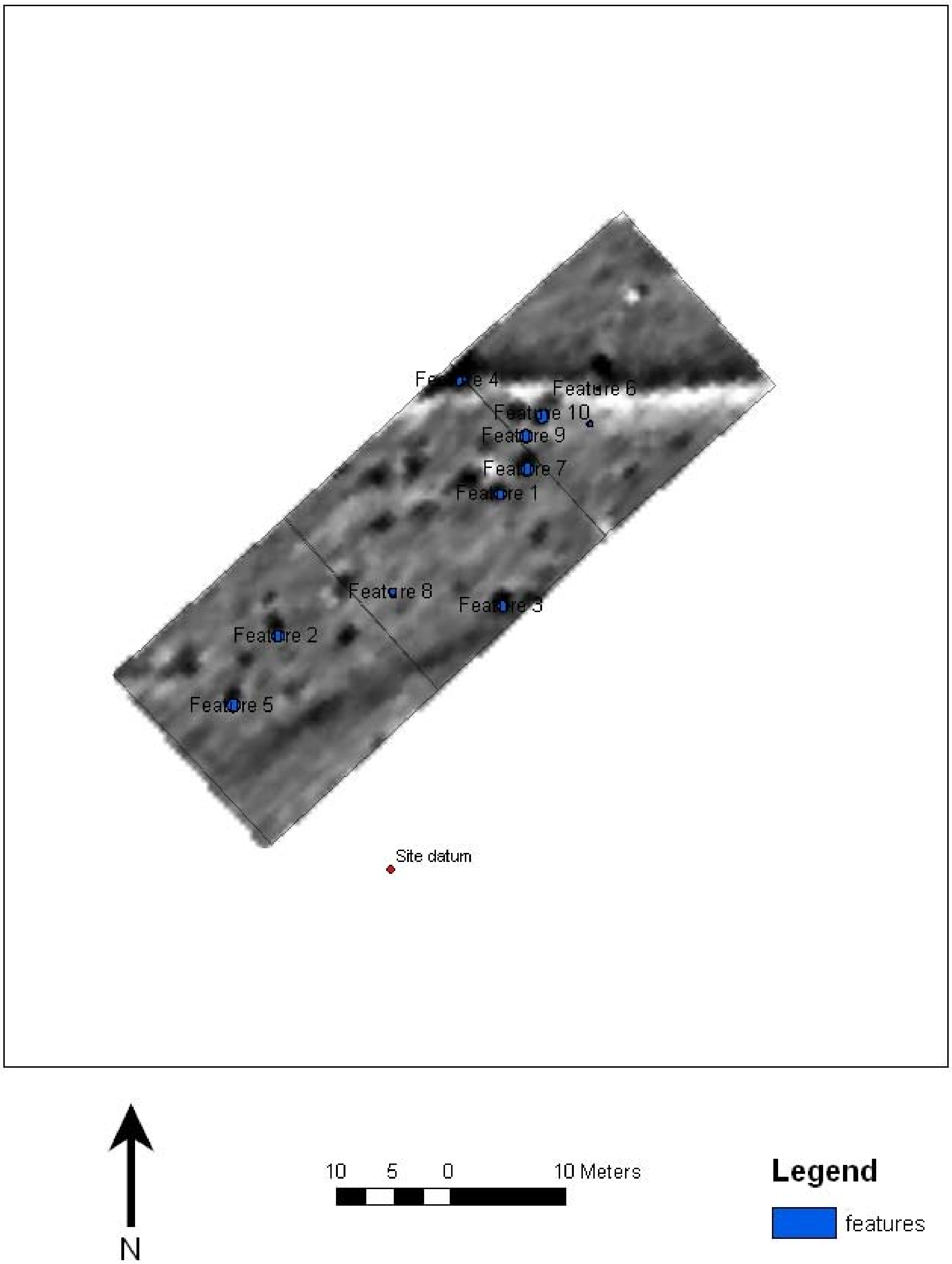

Figure 32. Gradiometer data and feature correlation.

Testing of the linear features did not identify cultural deposits A backhoe trench and 2 – 1 x 1 m units in the northern bipolar anomaly did not identify a cultural feature. This anomaly runs almost magnetic east-west. Due to the bipolar nature of the anomaly, it was thought it might represent a field tile. However, no evidence of a tile was encountered. An amorphous soil stain was encountered in the excavated units, but no difference in artifact density was detected. Further research revealed that a field boundary once occurred at this location as evidenced by a 1942 aerial photograph from the Electronce Atlas of Central Indiana (http://in-ulib-dawson.ads.iu.edu). It is presumed a metal fence once occurred along this boundary. The diffuse eastern anomaly appears to correlate with a gravelly soil found at the base of the plowzone in Trench 3.

While the gradiometer survey was extremely useful in detecting aboriginal features, it did not detect all the features encountered during the testing. As previously mentioned Feature 8, a shallow basin feature was not clearly detected. In the reprocessed data, three dark gray circles appear near the location of Feature 8. This area had a reading of approximately +8, which is not as strong at the large earth oven features (+10 to 21). Feature 9, a large pit with burned sides, but little fire-cracked rock, was not detected in the gradiometer data. The location of this feature is near several magnetic anomalies. Features 7, 10, 12 and 13 were all detected. Perhaps the clustering of anomalies overshadowed Feature 9 or the low number of fire-cracked in Feature 9 made it indistinguishable. The location of the anomalies in the gradiometer and the survey (total station) data was somewhat distorted. Feature 9 may represent one of the anomalies detected in this area and one of the other features (ie. Feature 12 or 13) was not detected. Features 12 and 13 were not excavated. Feature 11, a dark circular stain found in Trench 1 was not detected in the gradiometer data. Since, the feature was not excavated, it is not known if the feature had magnetic properties.

The reprocessed data showed an interesting arrangement of circular anomalies near the center of the composite in grids 1 and 2. The circular anomalies are arranged in an oblong shape approximately 12 m x 18 m in size. Figure 33 uses a different color palette to show this arrangement. No strong readings were encountered in the center of the oblong shape. While there is no evidence other than the arrangement of the anomalies, there is the possibility that a structure or structures may have existed in this area. If the structure(s) was similar to a wigwam, support posts may have obliterated by plowing. The presence of small, basin pits on the interior and large, cooking and refuse pits on the exterior of the structure are plausible. A unit placed in the assumed interior of the structure found no sub-plowzone deposits and the artifacts recovered from the plowzone were not different from those found elsewhere on the site. Again, the interpretation of a structure at this location is conjecture at this point and requires further field examination.

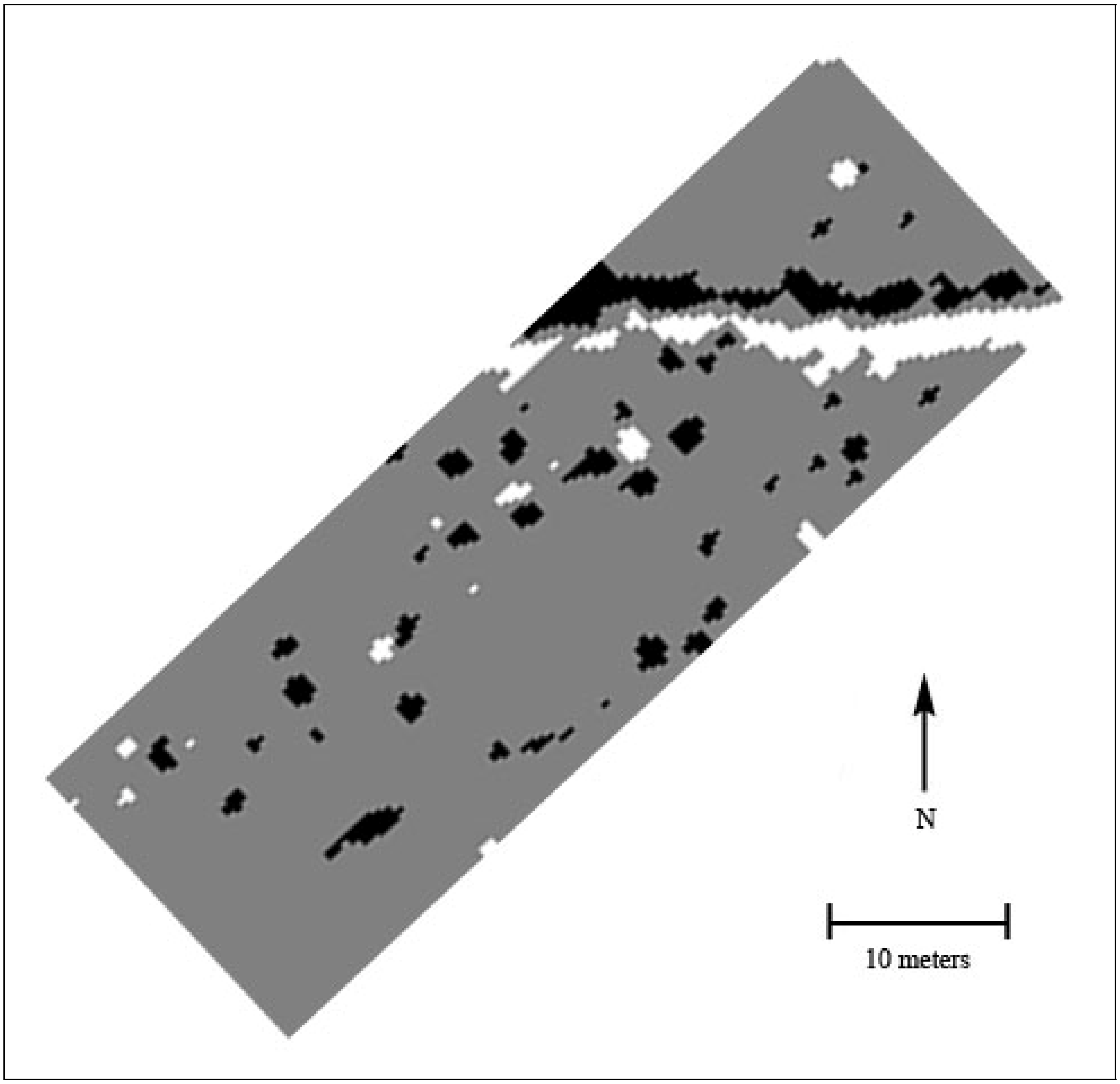

Figure 33. Oblong shape found in gradiometer survey.

4.3.2.3 Summary

The gradiometer survey was an important component in the investigation of site 12-H-993. The results of the survey were useful in planning the excavations at the site and saved time and effort. The survey also provided information on the density of features in the area investigated that would have not been obtained otherwise, since stripping and excavation of the entire area was not financially feasible. If the density of features found within the area investigated holds for the entire site, over 4000 large pit features would be present at the site. As useful as the survey was, it had limitations. Non-magnetic deposits were not discovered by the survey and gradiometer surveys cannot be relied on to find all aboriginal deposits.

4.3.3 Augers

Three auger tests were excavated within the project area. The augers were used to sample subsurface sediments and determine if sub-plowzone deposits exist. The tests were excavated at higher elevations (Auger 1 and 2) and near the low lying swale (Auger 3) in the areas where no magnetic anomalies were detected (Figure 34).

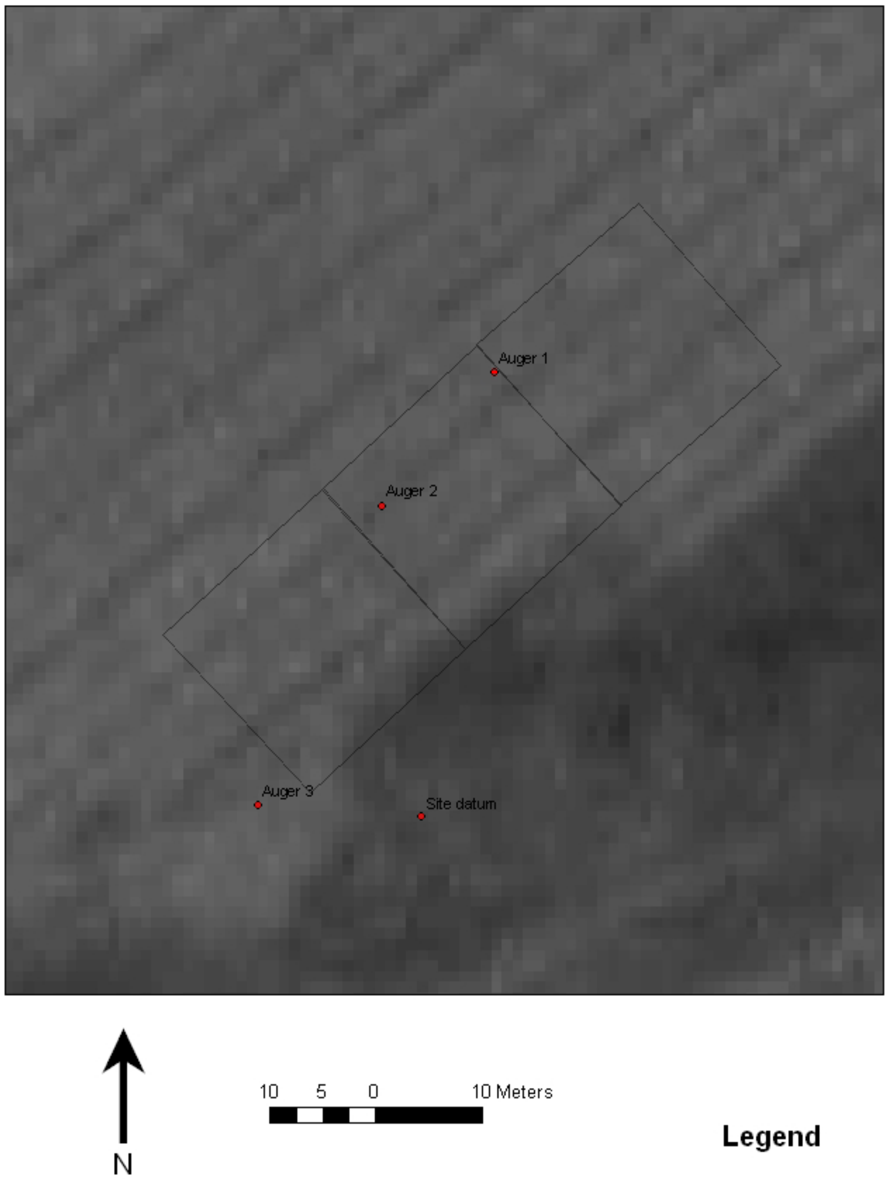

Figure 34. Location of auger tests.

4.3.3.1 Results

The auger tests provided information on the alluvial deposits within the project area. Descriptions of the auger tests and materials recovered from the screened tests are shown d in Table 22.

Table 22
Description of Auger Tests

Auger	Depth (cm)	Color	Texture	Artifacts
Auger 1 (N4441973.66, E588425.78)	0-10	10YR 3/2	Clay loam	None
	10-20	10YR 3/2	Clay loam	None
	20-30	10YR 3/2	Clay loam	4 flakes, 2 bone, 5 sherds
	30-40	10YR 4/2	Loam	1 flake
	40-50	10YR 4/2	Loam	None
	50-60	10YR 4/2	Loam	None
	60-70	10YR 4/2	Clay loam	1 flake
	70-80	10YR 4/3	Clay loam	None
	80-90	10YR 4/4	Loamy clay	None
	90-100	10YR 4/4	Loamy clay	None
	100-110	10YR 4/6	Gravelly clay loam	None
	110-120	10YR 4/6	Gravelly clay loam	None
Auger 2 (N4441961.11, E588415.17)	0-10	10YR 3/2	Clay loam	None
	10-20	10YR 3/2	Clay loam	None
	20-30	10YR 3/2	Clay loam	1 flake, 2 bone, 1 fcr
	30-40	10YR 4/2	Clay loam	None
	40-50	10YR 4/2	Clay loam	None
	50-60	10YR 4/4	Loam	None
	60-70	10YR 4/4	Loam	None
	70-80	10YR 4/4	Clay loam	None
	80-90	10YR 4/4	Sandy clay loam	None
	90-93	10YR 4/4	Gravelly sandy clay loam	None
Auger 3 (N4441933.03, E588403.48)	0-10	10YR 3/2	Clay loam	1 flake
	10-20	10YR 3/2	Clay loam	None
	20-30	10YR 3/2	Clay loam	1 flake, 1 sherd, 1 bone
	30-40	10YR 3/2 with 5/2 mottles	Clay loam	None
	40-50	10YR 3/2 with 5/2 and 5/6 mottles	Clay loam	None
	50-60	10YR 5/2 with 4/2 and 5/6 mottles	Loamy clay	None
	60-70	10YR 5/2 with 4/2 and 5/6 mottles	Loamy clay	None
	70-80	10YR 5/2 with 4/2 and 5/6 mottles	Clay	None
	80-90	10YR 5/2 with 4/2 and 5/6 mottles	Clay	None
	90-96	10YR 5/2 with 4/2 and 5/6 mottles	Gravelly loamy clay	None

4.3.3.2 Summary

Each of the augers encountered gravelly deposits at the bottom. This likely represents the beginning of glacial outwash deposits. Above the gravelly clay loam/loamy clay the textures are fine grained and appear to be alluvial in nature. Augers 1 and 2 were most similar in color and texture but varied slightly. Auger 3 showed the influence of the lower lying and more poorly drained soils of the swale. No stable landforms or a buried A-horizon were suggested by the soils recovered from the augers. Artifacts were primarily found in the plowzone or upper 30 cm of the auger tests. However, Auger 1 contained material in the 30 to 40 cm and 60 to 70 cm levels. The flake in the 30 to 40 cm level could be from plowzone or plowzone-subsoil interface and does not indicate buried deposits. The flake in the 60 to 70 cm level is more difficult to interpret. The soil from this level or from any of the augers does not indicate a buried A horizon or living surface. Cultural material did not occur in the preceding 20 cm, so it is unlikely the flake was from an intrusive aboriginal feature. The flake may have originated higher in the profile, but was scraped from the side of auger hole during the removal or placing of the bucket auger. Ultimately, the presence of one flake between 60 and 70 cm is not sufficient to infer that buried cultural deposits exist in the area investigated although it indicates the possibility. Further investigation is needed to define the presence of buried deposits.

4.3.4 Units

Hand excavated units were utilized to sample the plowzone and examine site formation. Six hand excavated units were placed within the site grid (Figure 35). Units N6E8, N13E6, N29E17, N35E10, N39E1 and N41E1 were placed over areas with magnetic anomalies found during the gradiometer survey. Unit N29E10 was placed in an area without anomalies. Each of these units was 1 x 1 m in size and all excavated soil was screened. Units N6E8, N13E6, N29E17, and N35E10 each encountered features at the base of the plowzone (Figure 36). These units were not excavated deeper, but they were expanded to expose the feature. Units N39E1 and N41E1 contained an amorphous feature and were excavated below the plowzone to delineate the feature boundaries. Unfortunately the paperwork and artifacts from Units N39E1 and N41E1 were inadvertently mixed and have therefore been treated as one unit. Unit N29E10 encountered no features at the base of the plowzone, but was excavated deeper to examine stratigraphy.

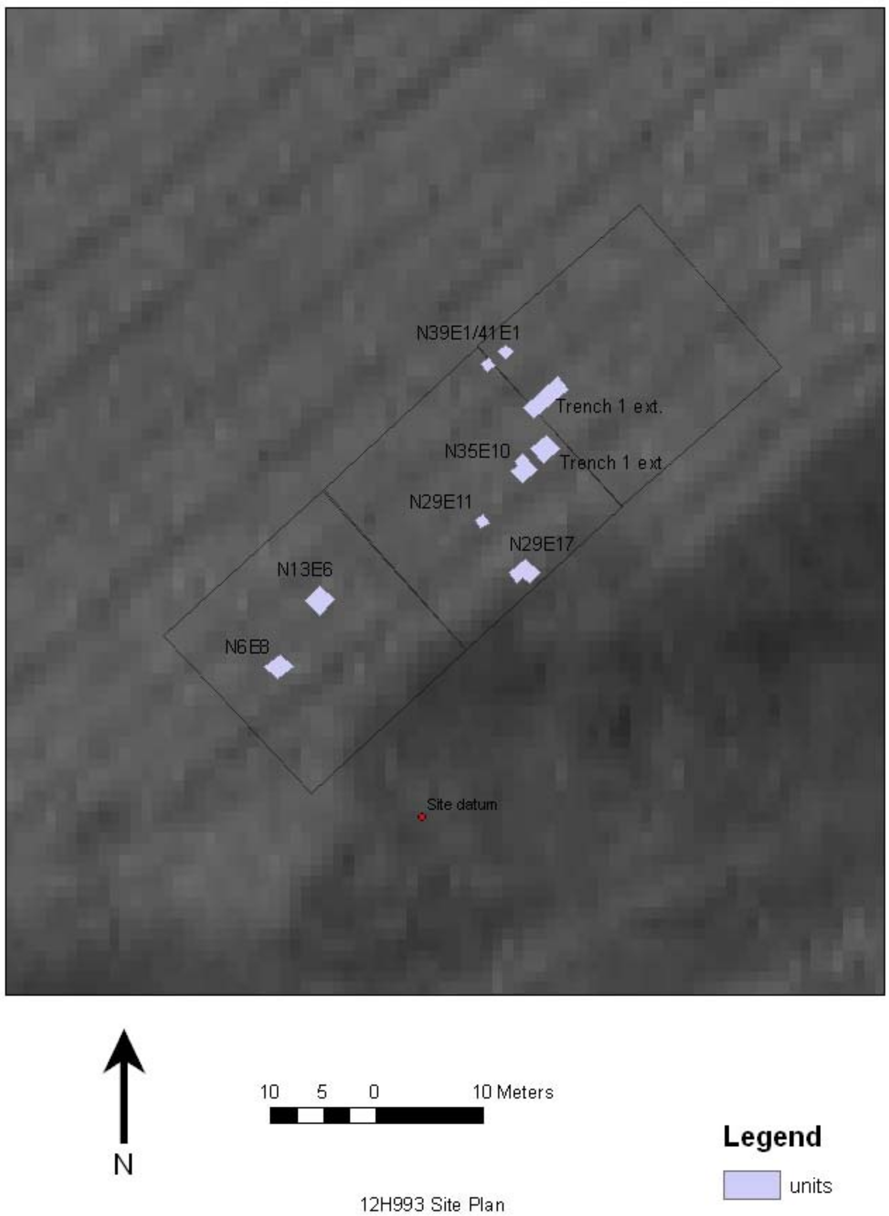

Figure 35. Location of units.

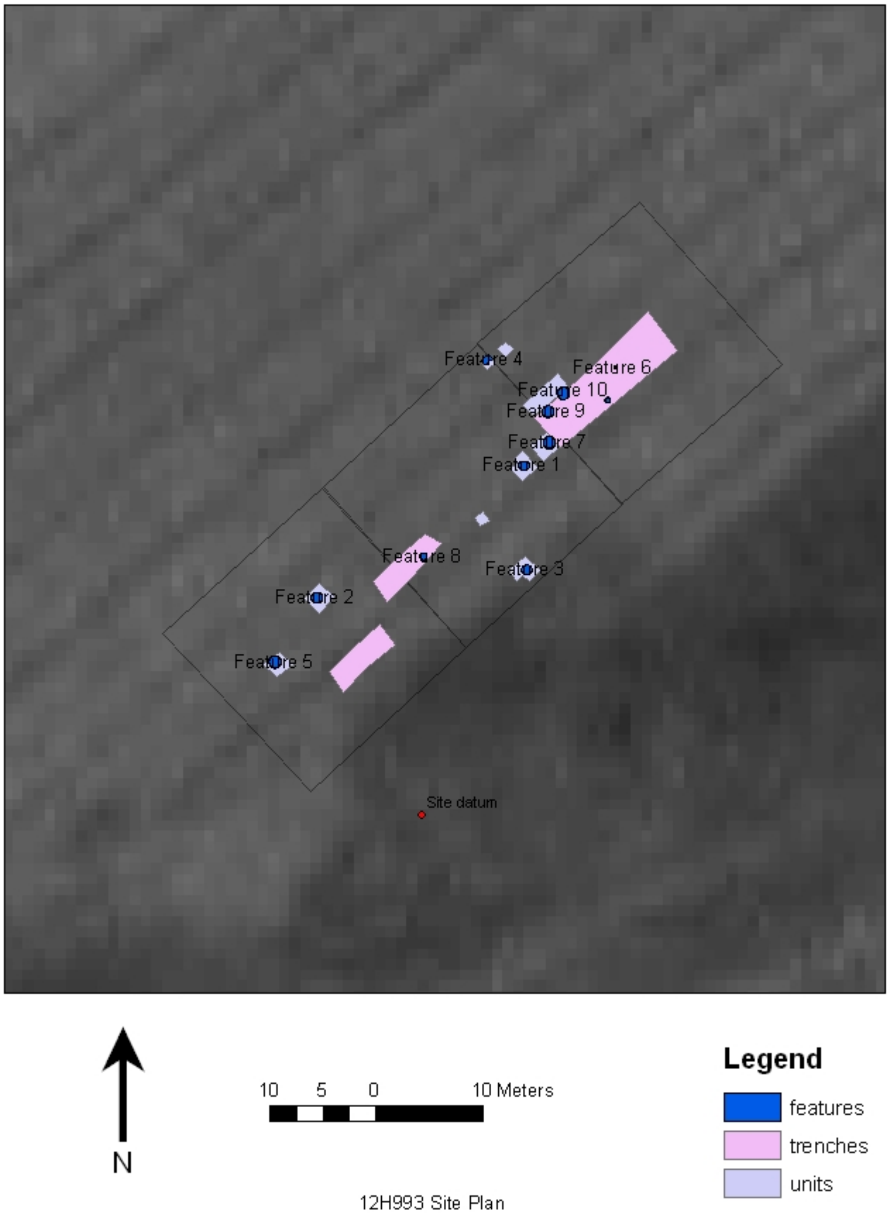

Figure 36. 12-H-993 site plan.

4.3.4.1 Description

Unit N6E8 was excavated in one level to approximately 26 cm below the ground surface. The soil excavated represented a plowed A-horizon that was a very dark grayish brown (10YR 3/2) clay loam. The excavation stopped at the subsoil, a dark grayish brown (10YR 4/2) loam. Twenty-seven artifacts were recovered from this unit. Feature 5, distinguished by the darker color of the surrounding subsoil, was discovered in the southeast corner of the unit. The unit was expanded to a 2 x 2 m square to expose the feature, but the soil was not screened.

Unit N13E6 was excavated to approximately 28 cm below the ground surface. The soil was excavated as one level, representing a plowed A-horizon that was a very dark grayish brown (10YR 3/2) clay loam. The subsoil was a lighter (10YR 4/2) loam. Eighty-one artifacts were found in the unit. Feature 2, distinguished from the lighter subsoil, was discovered in the southeast corner of the unit. The unit was expanded to a 2 x 2 m square to expose the feature. The soil from the expansion of the unit was not screened, but 9 artifacts were collected during the expansion.

Unit N29E11 was excavated in four levels. Level one, approximately 28 cm thick, was represented by the plowed A-horizon of a very dark grayish brown (10YR 3/2) clay loam. Eighty-three artifacts were recovered from the plowzone. No features were encountered at the base of the plowzone. The second level of 10 cm was dark grayish brown (10YR 4/2) loam subsoil. Only five artifacts were recovered in the second level and these were from the top 2 to 3 cm of the level at the interface of the plowzone. Levels 3 and 4 were each 10 cm thick. These levels were excavated into a dark yellowish brown (10YR 4/4) culturally sterile loam (Figures 37 and 38.)

Figure 37. Photo of Unit N29E1.

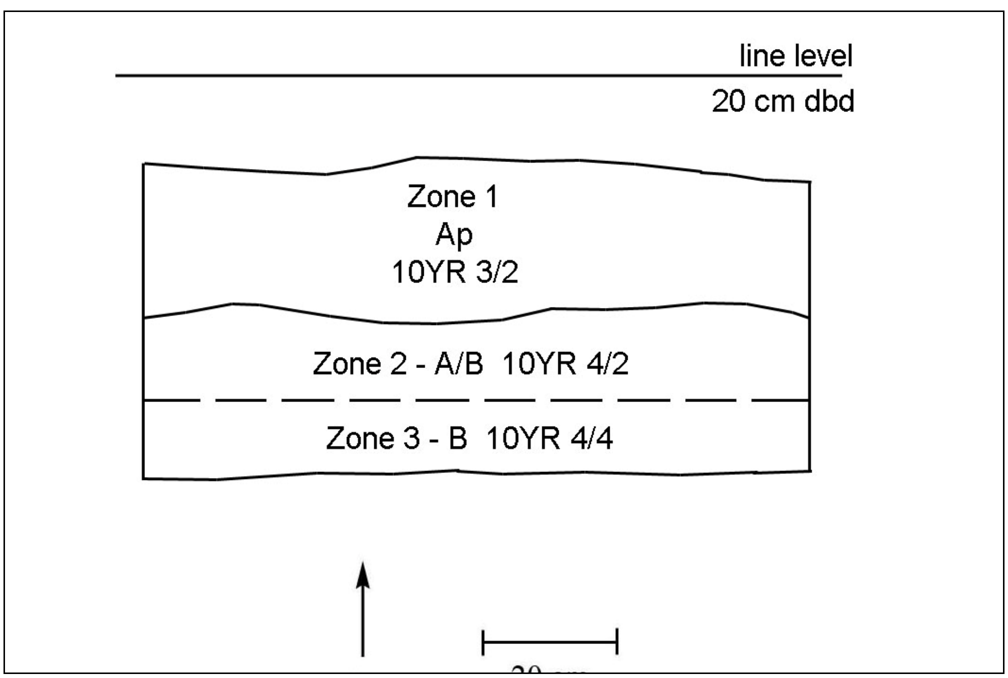

Figure 38. Profile of North wall of Unit N29E11.

Unit N29E17 was excavated in one level to approximately 27 cm below the ground surface. The soil excavated represented a plowed A-horizon of a very dark grayish brown (10YR 3/2) clay loam. The subsoil was a lighter (10YR4/2) loam. Seventy-nine artifacts were recovered from this unit. Feature 3, noted as a dark circular stain, was encountered in the northwest corner of the unit. The unit was expanded to nearly a 2 x 2 m square to expose the feature, but the soil was not screened.

Unit N35E10 was excavated as one level, representing a plowed A-horizon that was a very dark grayish brown (10YR 3/2) clay loam. The plowzone was approximately 28 cm deep. The subsoil was a lighter colored (10YR 4/2) loam. Fifty-six artifacts were found in the unit. Feature 1, distinguished as a dark stain in the lighter subsoil, was discovered in the southeast corner of the unit. To expose the feature, the unit was expanded to nearly a 2 x 2 m square. The soil was not screened during this expansion.

As mentioned, there were problems with the record keeping and excavation of Units N39E1 and N41E1. These two units were originally part of a 1 x 3 m unit that was divided into 1 x 1 m units. Unfortunately, this was not conveyed in the paperwork and material from these units was combined. Since, the units were closely spaced and similar in nature, the units were taken to represent one unit as originally designed. The plowzone was removed as one level approximately 26 cm deep. This level was a very dark grayish brown (10YR 3/2) clay loam. An amorphous very dark gray soil (10YR3/1) was apparent at the base of the plowzone in N39E1, but no definitive feature was observed. Excavation of Unit N39E1 and N41E1 continued in 10 cm levels. Unit N39E1 was excavated two more levels and Unit N41E1 was excavated four more levels (Figure 39). A distinguishable cultural feature was never encountered, but the soil remained dark. Profiles drawn for these units show a darker subsoil (10YR 3/2 and 10YR 3/1) than recorded elsewhere on the site (Figure 40). The darker soil color suggests organic material accumulating in this area. It is possible that this area is due to an old fence line that may have trapped or retained more organic soils. Artifacts recovered from these units totaled 150. No artifacts were recorded below level 2.

Figure 39. Photo of N41E1.

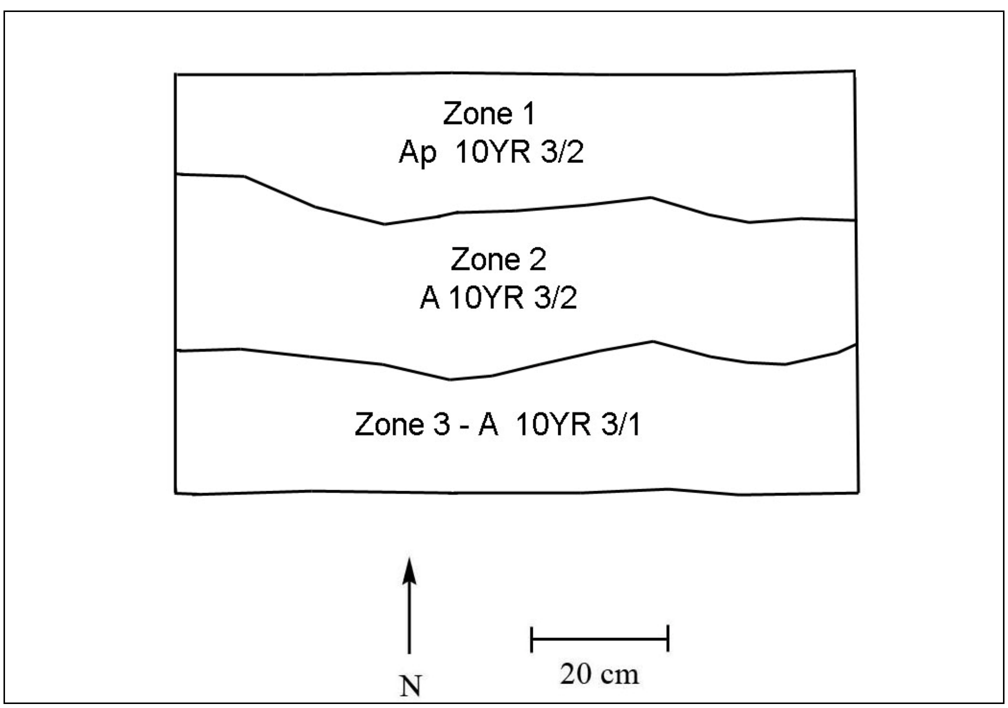

Figure 40. Profile of north wall of Unit N41E1.

4.3.4.2 Artifacts

A total of 479 artifacts were recovered from the screened portion of the units excavated. Table 23 provides a breakdown of artifacts by unit. A complete listing of artifacts by unit is contained in Appendix E.

Table 23
Artifacts from Units

Unit	Flakes	Core	Bipolar	Triangular Biface	Triangular Point	Other Chipped Stone	Pottery	Bone	Historic	Total
N6E8	14	1		1			10	1		27
N13E6	42		1		1		33	3	1	81
N29E11	41	1					46			88
N29E17	34			1			33	11		79
N35E10	29						22	5		56
N39E1/N41E1	77					1	61	7	2	148
Total	237	2	1	2	1	1	195	27	3	479

The dominant raw material used for the chipped stone artifacts was Fall Creek chert. Fall Creek represents 87.2%, Quartzite represents 7.8%, unknown chert represents 2.1%, Attica represents 1.6%, and Allens Creek and Indian Creek represent less than 1% of the chipped stone raw materials.

Diagnostic lithic artifacts included one Triangular point fragment and two Triangular bifaces. The Triangular point fragment from Unit N13E6 was manufactured from Quartzite. One of the Triangular bifaces was made from Fall Creek and the other was of Attica. The Triangular point and bifaces indicate a Late Woodland/Prehistoric age of the site consistent with the controlled surface collection.

The pottery recovered in the units were all grit tempered and appeared to fit with Late Woodland/Prehistoric styles found in the area. All but four of the sherds were body sherds. The majority (79.5%) of sherds were small and had eroded or exfoliated surface treatments. Other surface treatments noted included cordmarked (n=32), fabric marked (n=13) and smooth/plain (n=4). Four rims were recovered from the units (Figure 41). The rim from unit N6E8 (Figure 41a) was collared and had tool impressions on the across the crest of the collar the incised notches on the inner rim. This sherd fits the descriptions for Albee Phase ceramics (McCord and Cochran 1994, Winters 1967). The rim from Unit N13E6 (Figure 41c) has a smooth/plain surface treatment, a rim fold and possible knot impressions on the neck. The rims from Units N29E17 (Figure 41b) and N35E10 (Figure 41d) are small and show no decoration. These three rims appear consistent with ceramics defined in the Bowen series (Dorwin 1971) which have been included as part of the Oliver Phase (McCullough 2000, McCullough et al. 2004, White et al. 2002, 2003).

Figure 41. Pottery from units.

4.3.4.3 Summary

The quantity of artifacts recovered from the units did not seem to have a relationship to whether the unit overlaid a feature. Unit N29E11 had just as many if not more artifacts than units where features were uncovered. However, Feature 5, found at the base of Unit N6E8, had the lowest quantity of artifacts found in the features excavated. So the quantity of artifacts found in plowed over features, may indeed have some impact on the plowzone quantity of artifacts. The kinds of artifacts recovered from the units were consistent with artifacts found in the feature fill. Whether all midden was disposed of in the pits encountered at the site, or if there were surface midden deposits cannot be discerned due to the plowed context.

The units did not reveal evidence for sub-plowzone deposits. Cultural material recovered was confined to the plowzone or the plowzone/subsoil interface or features excavated into the subsoil.

4.3.5 Trenches

Mechanically stripping was utilized to expose the sub-plowzone in an expeditious manner. The stripping also allowed a larger area of the gradiometer data to be tested. After the gradiometer survey and the hand excavated units were initiated, a backhoe was used to strip the plowzone from three areas with and without magnetic anomalies (Figure 42). After the plowzone was removed, the trench floors were shovel and/or trowel scraped to identify cultural deposits.

4.3.5.1 Results

Trench 1 was excavated at the northern end of the area investigated. The area stripped was approximately 4.0 m EW x 14.5 m NS. Within this area several magnetic anomalies, including the linear bipolar anomaly, were detected by the gradiometer. Several features or portions of features were encountered. Features 7, 9, 10, and 12 appeared as dark circular stains and were detected by the gradiometer. All of these features, except Feature 12, were excavated (see Section 4.3.6). Feature 6 appeared as a concentration of pottery and was not detected by the gradiometer. Feature 11, a dark circular stain was also not detected by the gradiometer. Feature 11 was not excavated. No feature or soil variation was detected in Trench 1 in the area of the linear bipolar anomaly found by the gradiometer survey further supporting the notion the anomaly was a surface or near surface manifestation.

Trench 2 was excavated in the central portion of the area investigated. The area stripped was approximately 2.5 m EW x 7.1 m NS. No magnetic anomalies were detected in the area. Feature 8 was revealed as a dark circular stain at the northern end of the trench. This feature was excavated and documented in a later section of this report.

Trench 3 was excavated at the southern portion of the area investigated. The area stripped was approximately 2.4 m EW x 6.7 m NS. No strong circular anomalies were detected in this area, but an arching weak signature did occur. No features were encountered in this trench, but a gravelly deposit did occur. The gradiometer may have detected this gravel.

4.3.5.2 Summary

The trenches helped to remove the plowzone in an efficient and effective manner. The trenches allowed a larger area of the site to be examined. They also allowed a larger portion of the gradiometer data to be tested.

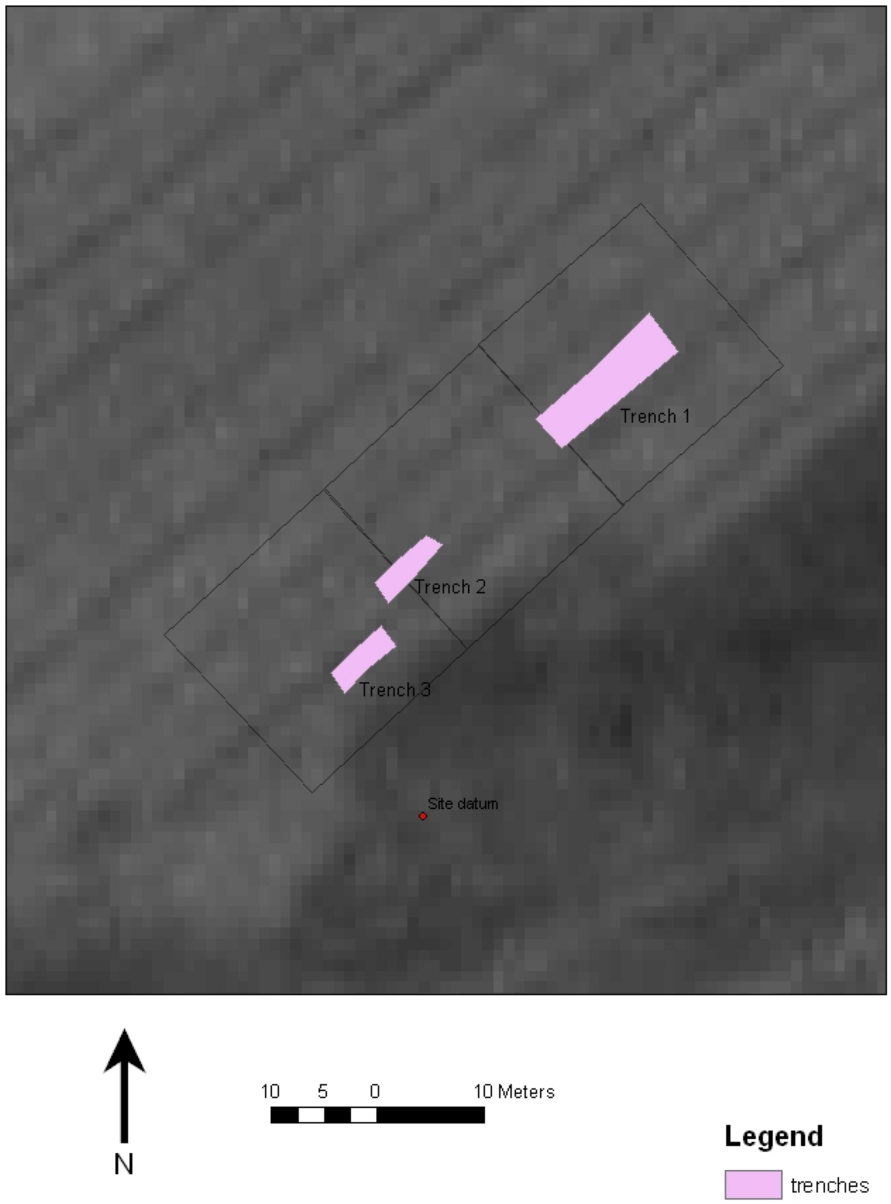

Figure 42. Location of trenches.

4.3.6 Features

Thirteen features were recorded during the excavation. Twelve features appeared to be cultural in origin. Nine of the features were excavated. Due to time and budget constraints, the remaining three features were not excavated. The eight pit features that were excavated appeared to represent three feature types: deep pits, a shallow pit, and earth ovens (Table 24). A description of the features and feature contents is presented below. More detailed analyses of the lithics, pottery, bone and samples of flora and fauna follows. The feature contents presented below represent only the screened east half of the feature and should represent a 50% sample of each feature (Table 25). Analyses from the second half of the feature that was taken as flotation samples were not completed at the time this report was completed and will be presented in later addendum. The contents of the features from the floted half were included in Appendix E.

Table 24
Summary of Features

Feature No.	Size*	Depth (bgs)	Volume** (L)	Description/Interpretation
1	82 cm NS x 108 cm EW	124 cm	860	Large, deep, oblong pit, bell to concave-shape, filled with midden
2	100 cm NS x 108 cm EW	122 cm	840	Large, deep, circular earth oven with FCR, charcoal and burning, concave to bell-shape, filled with midden
3	90 cm NS x 98 cm EW	139 cm	820	Large, deep, circular earth oven with FCR, charcoal and burning, concave to bell-shape, filled with midden
4	Unknown	Unknown	Unknown	Natural feature – possible filled in channel
5	114 cm EW x 116 cm NS	115 cm	900	Large, deep, circular pit, bell to concave shape, filled with midden
6	24 cm EW x 24 cm NS	11 cm	n/a	Small pottery concentration at the base of the plow zone
7	108 cm EW x 120 cm NS	117 cm	985	Large, deep, circular earth oven with FCR, charcoal and burning, slight bell-shape, filled with midden
8	66 cm EW x 68 cm NS	51 cm	75	Small, shallow pit, basin-shape, filled with midden
9	110 cm EW x 112 cm NS	97 cm	660	Large, deep, circular earth oven with burning, basin-shape, filled with midden
10	114 cm EW x 116 cm NS	88 cm	612	Large, deep, circular earth oven with FCR, charcoal and burning, basin-shape, filled with midden
11	Not excavated		Unknown	Circular pit
12	Not excavated		Unknown	Circular pit
13	Not excavated		Unknown	Circular pit

*Size for Features 1 – 5, 7, 9 – 10 was taken from the plan of level 3 when the feature boundaries were well defined. Features 6 and 8 were taken from the plan of level 1.
Bgs= below ground surface
** Volume was obtained using $V= r^2 \times \Pi \times h$, this may underestimate the bell shaped features

Table 25 Summary of Feature Contents (screened sample)									
Feature	Chipped Stone	Ground Stone	Other Chipped Stone	Pottery	Bone	Shell	FCR (#/Kg)	Historic	Total (w/o fcr)
1	252	1		400	540	76	52/5.75	6	1274
2	212			226	347	23	231/54.25		808
3	89			115	183	16	271/104.25		403
5	48			80	46		18/1.5		174
7	689	1	2	899	1295	5	274/35.0		2891
8	19	1		151	62		5/1.5		233
9	78	1		96	39		11/0.5		214
10	64			189	101		245/40.75		354
Total	1450	4	2	2156	2613	120	1107/243.5	6	6351

4.3.6.1 Descriptions

4.3.6.1.1 Feature 1

Feature 1 was discovered at the base of the plowzone in unit N35E10. The feature appeared as a dark soil stain and contained artifacts. It had a very amorphous outline when initially discovered. Plowing and bioturbation obscured the definition of a clear outline of the feature until the third level. The feature was oblong in plan view and measured approximately 82 cm NS x 108 cm EW (Figure 43). The feature reached 124 cm below the current ground surface and extended well into Pleistocene gravels (Figure 44). Due to the amorphous boundaries, the feature was not very evenly divided between two halves when it was bisected. Approximately 1/3 of the feature was excavated as the E ½ and screened. About 2/3 of the feature was excavated as the W ½ and taken as a flotation sample.

There were no distinguishable stratified fill episodes observed during the excavation or in the profile (Figures 43 and 45). There was a powdered calcium carbonate deposit near the bottom of the feature. The feature profile revealed a concave to bell shape for the feature with a slightly rounded bottom. The fill consisted of a midden deposit and the contents are reported in Table 26. Only small pieces of charcoal mixed in the midden fill were recovered during the excavation. No samples were submitted for radiocarbon dating.

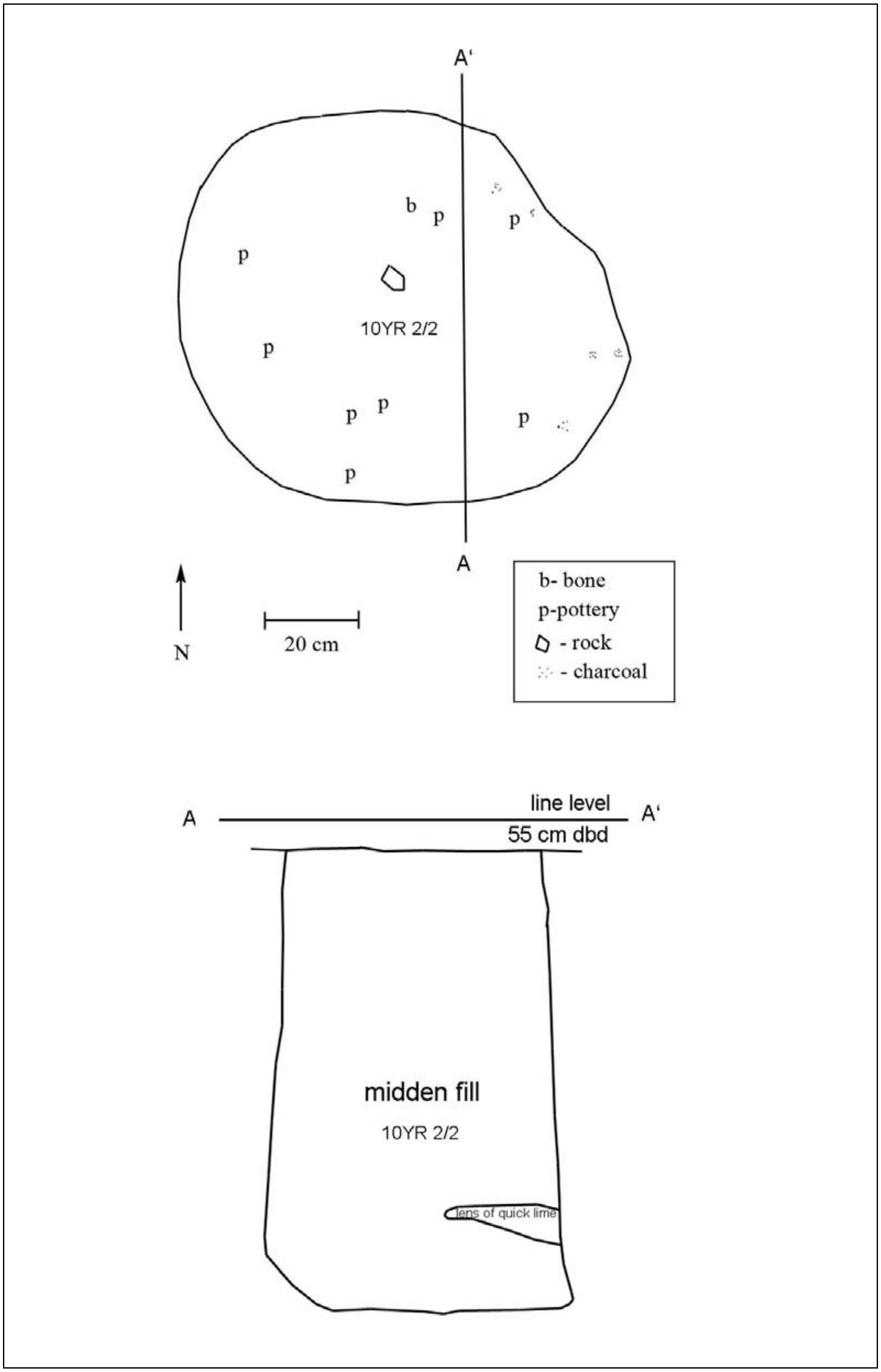

Figure 43. Plan and profile of Feature 1.

Figure 44. Photo of Feature 1.

Figure 45. Photo of Feature 1 profile.

Table 26 Feature 1 Contents (E ½)														
Level	Depth	Unmodified Flake	Modified Flake	Core	Bipolar	Block	Points	Ground Stone	Pottery	Bone	Shell	FCR (#/Kg)	Historic	Total (w/o FCR)
1	55-62	9					1		33	7		1/>0.25		50
2	62-71	30							29	53		2/>0.25		112
3	71-81	50	2						85	10		1/0.25		147
3*	71-81	11	1		1				25	25				63
3^	71-81								3	1			6	10
4	81-90	22	1						36	50		3/0.25		109
5	90-101	42	1	2		1	2		74	189	10	5/0.75		321
6	101-111	23					1		27	62	10	5/1.25		123
7	111-120	27						1	33	80	13	9/0.5		154
8	120-131											6/1.25		0
9	131-142	9	1	1	1				19	26	34	18/0.75		91
10	142-152	7							18	22	9	2/>0.25		56
Wall	-	6							18	15				39
Total		236	6	3	2	1	4	1	400	540	76	52/5.75	6	1274
*Possibly mixed with F2 ^ Rodent run														

4.3.6.1.2 Feature 2

Feature 2 was revealed at the base of the plowzone in unit N13E6. The feature was presented as a dark circular soil stain with artifacts. The feature outline was diffuse at the base of the plowzone but the boundaries were clearly defined by the second level. The feature was nearly circular in plan view and measured approximately 100 cm NS x 108 cm EW (Figure 46). The feature had been excavated into the natural Pleistocene gravel and was approximately 122 cm deep below the present ground surface (Figure 47).

The feature profile revealed a concave to bell-shape appearance (Figure 46). A layer of fire-cracked rock and charcoal were encountered at the base of the feature. Reddened soil, presumably from heating, was observed at the edges of the feature, particularly on the western side. The feature fill above the fire-cracked rock layer appeared to be a fairly homogenous midden deposit (Figure 48), but one discrete dumping episode was defined. An area with a higher concentration of fire-cracked rock, mussel shell and charcoal, but with a diffuse boundary, was apparent in the western half of the feature and designated Feature 2A.

The feature fill contents are presented in Table 27. From the charcoal and fire-cracked layer at the base of the feature, several carbon samples were taken. One of the samples from Level 9 (145 cm dbd) was submitted for dating. The resultant date was 880 ± 60 BP (Beta-199996).

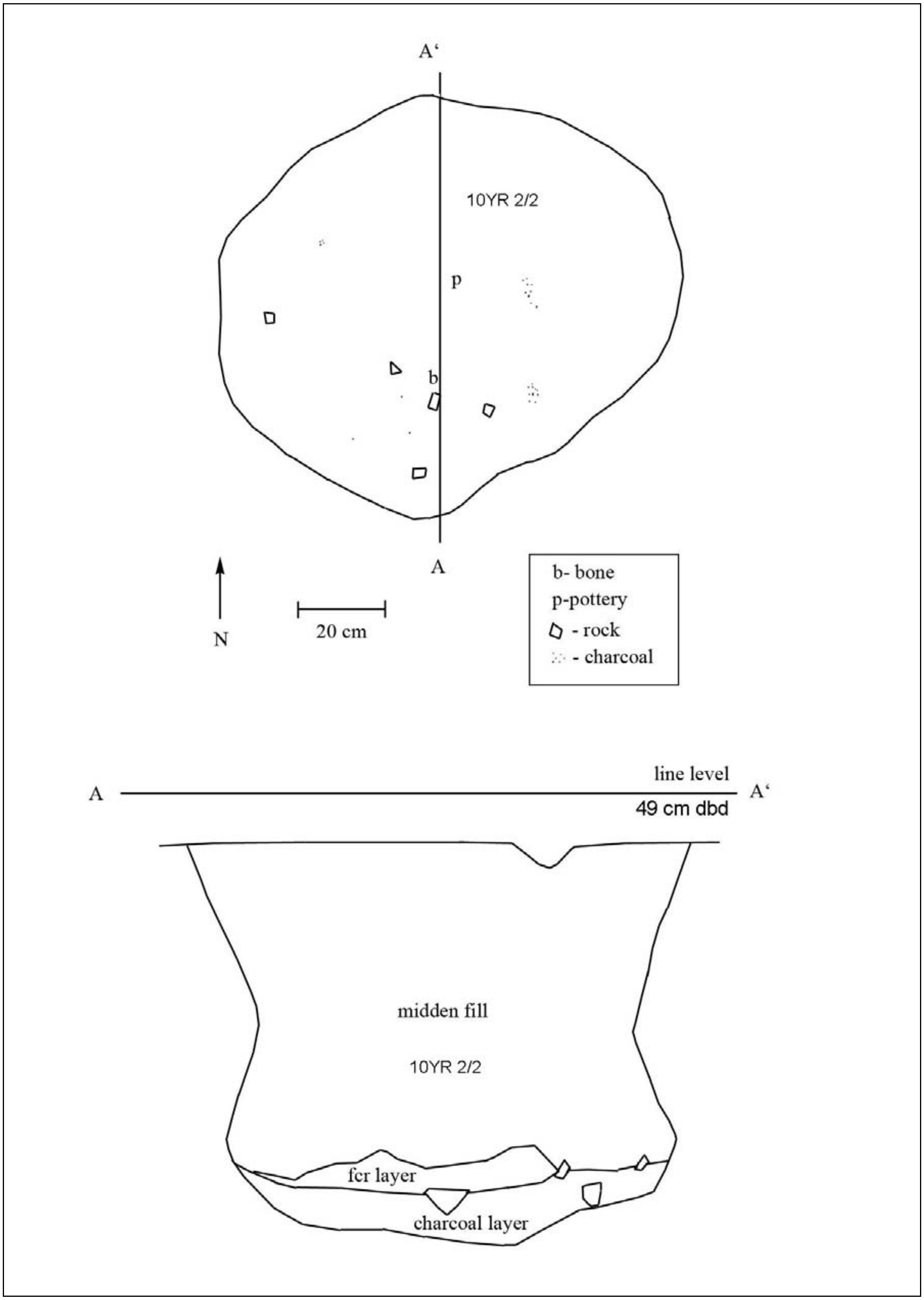

Figure 46. Plan and profile of Feature 2.

Figure 47. Photo of Feature 2.

Figure 48. Photo of Feature 2 profile.

Table 27 Feature 2 Contents (E ½)											
Level	Depth	Unmodified Flake	Modified Flake	Core	Points/Bifaces	Pottery	Bone	Bone Tools	Shell	FCR (#/Kg)	Total (w/o FCR)
1	60-70	37	6		1	53	58				155
2	70-80	40	1	1	1	54	53				150
3	80-90	70		1		75	115		1	8/0.75	262
4	90-100	19		1		15	36		11	9/0.5	82
5	100-110	10	1			5	24	1	1	40/4.5	42
6	110-120	2				11	23		2	24/1.0	42
7	120-130	11				5	16		5	16/1.0	37
8	130-140	1				1	5		2	58/22.75	9
9	140-151									76/23.75	
wall	-	5				7	16		1		29
Total		195	8	3	2	226	346	1	23	231/54.25	808

4.3.6.1.3 Feature 3

Feature 3 became apparent at the base of the plowzone in unit N29E17. The feature began as a somewhat amorphous dark soil stain that contained artifacts. A more circular outline became more obvious as the feature was excavated. The feature measured approximately 90 cm NS x 98 cm EW (Figure 49). This feature was the deepest one excavated and reached approximately 139 cm below the ground surface. The feature extended into the natural Pleistocene gravels (Figure 50).

The feature had a concave to bell-shape form in profile. At the bottom of the feature a thick layer (nearly 40 cm) of large fire-cracked rock and charcoal were encountered. The edges of the feature above the fire-cracked rock were burned red. The remainder of the feature was filled with a midden deposit. No definable strata were identified in the midden deposit. The midden contents are presented in Table 28.
The feature contained a large quantity of charcoal at the bottom. A sample from Level 12 (161 cm dbd) was submitted for radiocarbon dating. The date obtained was 700 ± 60 BP (Beta-199997)

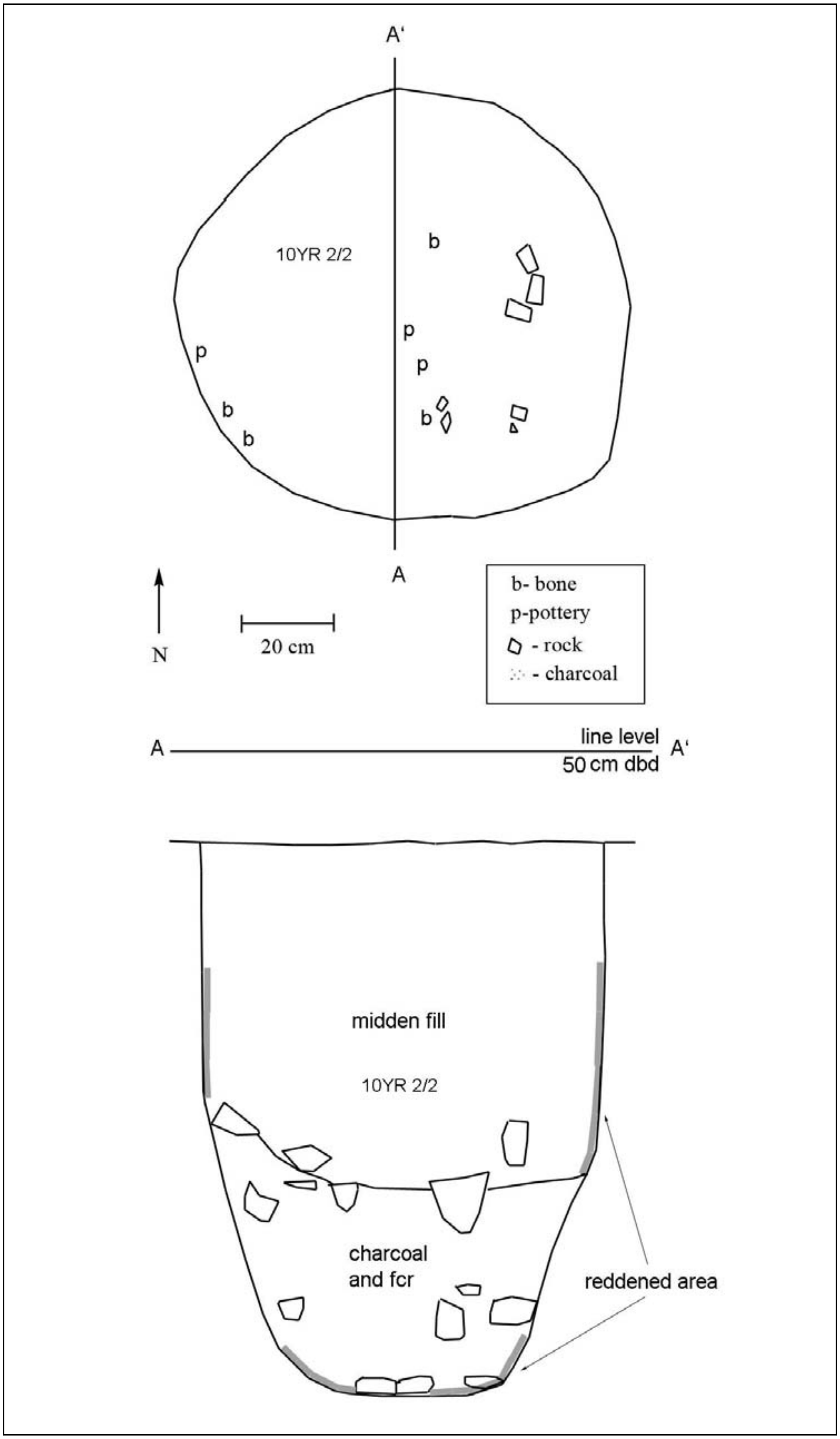

Figure 49. Plan and profile of Feature 3.

Figure 50. Photo of Feature 3.

Table 28 Feature 3 Contents (E ½)											
Level	Depth	Unmodified Flake	Modified Flake	Core	Points	Pottery	Bone	Bone Tools	Shell	FCR (#/Kg)	Total (w/o FCR)
1	53-61	12			1	11	25				49
2	61-71	12		1	1	8	23				45
3	71-81	7				11	14				32
4	81-89	4				9	25		1		39
5	89-96	10	2		1	20	28		5		66
6	96-109	8				12	28		5		53
7	109-119	9	1			21	17		3	3/0.25	51
8	119-125	18	1			23	13		2	26/22.5	57
9	125-131	1					10			108/28.0	11
10	131-144									38/26.75	
11	144-151									60/21.25	
12	151-161									34/5.0	
13	161-169									2/0.5	
Total		81	4	1	3	115	183		16	271/104.25	403

4.3.6.1.4 Feature 4

Feature 4 was defined at the base of the plowzone in unit N39E1. The feature was an amorphous dark soil stain (Figure 51). As the feature was excavated, no definable outline was apparent. Artifact density between Feature 4 and the remainder of unit N39E1 was not very different. Feature 4 contained 7 unmodified flakes (Fall Creek) and 11 grit tempered body sherds. (Unit N39E1 contained 7 grit tempered body sherds and 4 fragments of burned bone). The excavation of the feature and unit were terminated at approximately 51 cm below the ground surface. The feature appeared to be a natural deposit, possibly an accumulation of organic material at an old field boundary. The feature correlated with a linear bipolar anomaly detected during the gradiometer survey. No further exploration of the anomaly was undertaken.

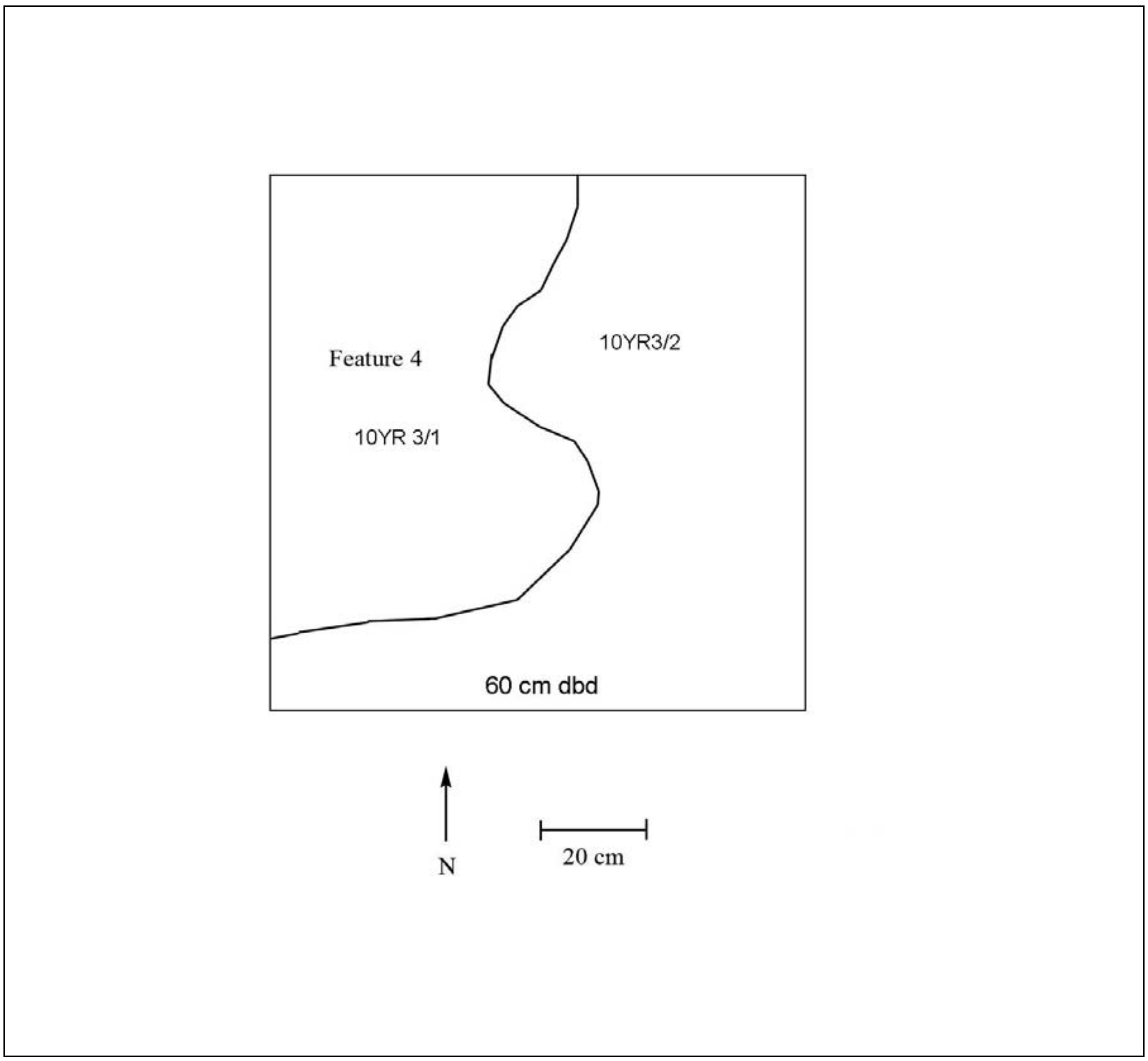

Figure 51. Plan of Feature 4.

4.3.6.1.5 Feature 5

Feature 5 was discovered at the base of the plowzone in unit N6E8. The feature had a roughly circular outline that became better defined and more circular as the excavation proceeded. The feature measured approximately 114 cm EW x 116 cm NS (Figure 52). The feature extended into the Pleistocene gravel and was approximately 115 cm below the present ground surface (Figure 53).

The feature had a bell to concave shape in profile (Figure 52). No definable strata were recorded in the feature fill (Figure 54). No burning at the edges and no layer of fire-cracked rock was encountered at the bottom. The fill consisted of midden deposit. The contents are summarized in Table 29. This is the only feature that contained Albee Phase diagnostic ceramics. Unfortunately, the feature did not produce any large charcoal pieces. A radiocarbon sample was not submitted.

Table 29
Feature 5 Contents (E ½)

Level	Depth	Unmodified Flake	Core	Points	Pottery	Bone	FCR (#/Kg)	Total
1	61-71	12		1	26		8/0.5	39
2	71-81				4		9/0.5	4
3	81-88	10	2		7	3		22
4	88-98	16			34	15	1/0.5	65
5	98-108	4			7	22		33
6	108-120	1			1	6		8
wall	-	2			1			3
Total		45	2	1	80	46	18/1.5	174

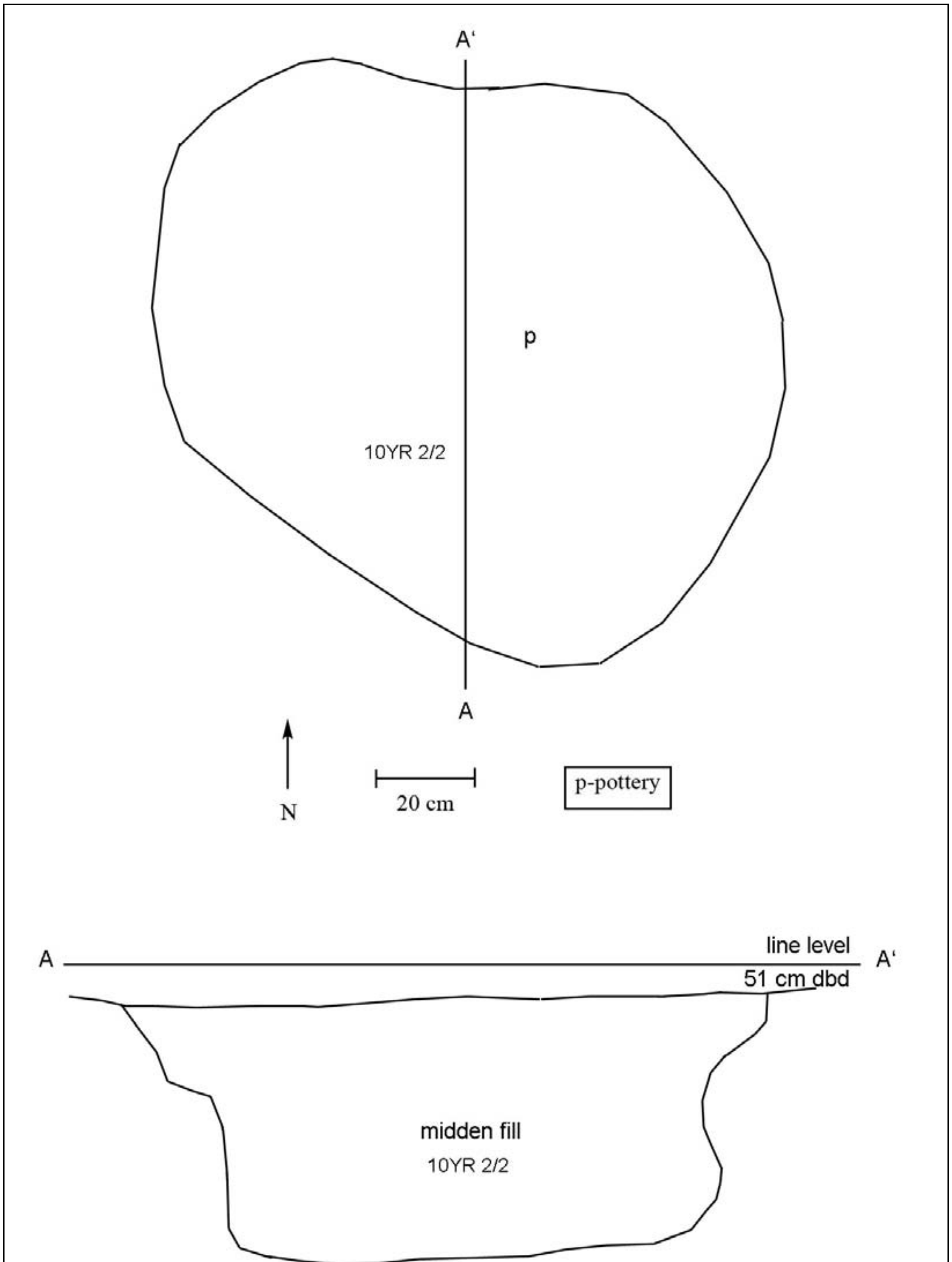

Figure 52. Plan and profile of Feature 5.

Figure 53. Photo of Feature 5.

Figure 54. Photo of Feature 5 profile.

4.3.6.1.6 Feature 6

Feature 6 became apparent during the plowzone stripping in Trench 1 (Figure 55). There was no discernable soil outline. The feature consisted of a cluster of sherds and fire-cracked rock. The concentration measured approximately 24 cm across and was approximately 11 cm deep below the base of the plowzone. The feature was not bisected due to the small size. A block of soil approximately 35 cm x 40 cm was removed around the pottery in a 10 cm level. All the excavated soil was screened. The concentration contained 33 body sherds representing two vessels, one cordmarked and one fabric marked, and nine bone fragments.

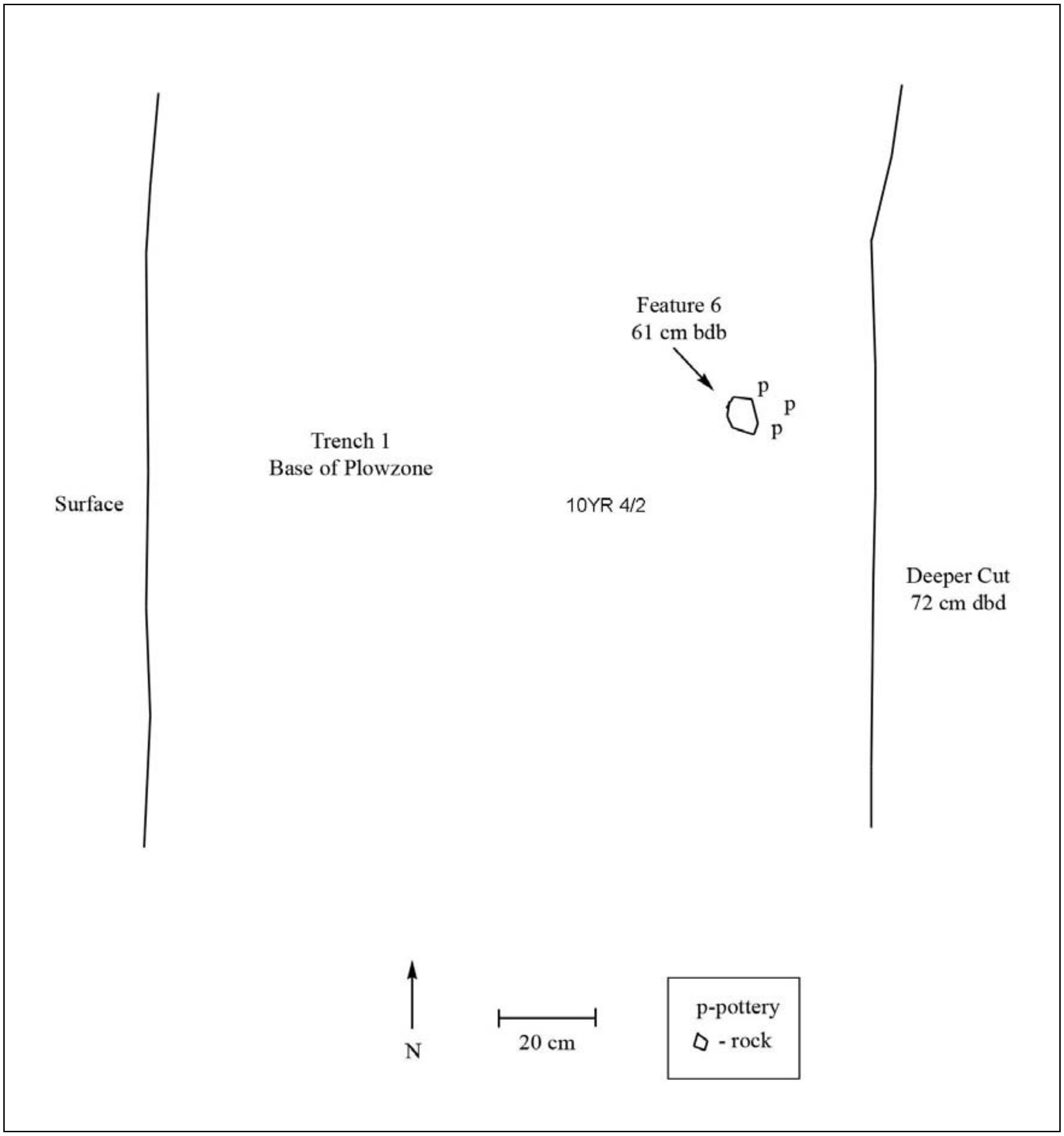

Figure 55. Plan of Feature 6.

4.3.6.1.7 Feature 7

Feature 7 was encountered during the plow zone stripping at the south end of Trench 1. Only the northern tip of the feature was uncovered in Trench 1. The plow zone from a 2 x 2 m area (N37E10) was removed by hand, but was not screened. The feature appeared as a dark, oblong soil stain that contained artifacts. The feature outline became more circular as the excavation progressed. The feature measured approximately 108 cm EW x 120 cm NS (Figure 56). The feature was excavated into the Pleistocene gravels at a depth of approximately 117 cm below the present ground surface (Figure 58).

The feature had a slight bell-shape in profile (Figure 56). At the bottom of the feature a discontinuous layer of fire-cracked rock and charcoal were encountered. The walls of the feature were fire reddened. The fill above the fire-cracked rock was a midden deposit (Figure 58). No stratified deposits were recognized, but a large concentration of bone was noted on the western side of the feature in levels 4 and 5. The midden contents are presented in Table 30. Several carbon samples were taken from the charcoal layer at the bottom of the feature and from corn cobs when encountered. A corn cob sample from Level 9 (136-137 cm dbd) was submitted for radiocarbon dating. The resultant AMS date was 820 ± 40 BP (Beta-199998).

Table 30
Feature 7 Contents (E ½)

Level	Depth	Unmodified Flake	Modified Flake	Core	Bipolar	Perforator	Points	Ground Stone	Other Chipped Stone	Pottery	Bone	Bone Tools	Shell	FCR (#/Kg)	Total (w/o FCR)
1	53-63	57	1	1	1					114	53			6/0.25	227
2	63-73	77	1				1			134	111			17/0.5	324
3	73-83	57	1				1			82	68			3/>0.25	209
4	83-93	74	1							88	118			7/>0.25	281
5	93-103	50			1		2			113	132	1		11/0.5	299
6	103-113	59	2		1	1			2	106	115	2	1	7/1.0	289
7	113-123	103	1	1				1		106	245		1	19/5.0	458
8	123-133	94	2							70	236		1	14/0.75	403
9	133-143	26				1	1			12	56	1	1	126/9.0	98
10	143-147	1								4			1	64/17.5	5
wall	-	63	3		1	1	2			71	157				298
Total		661	12	2	4	3	7	1	2	899	1291	4	5	274/35.0	2891

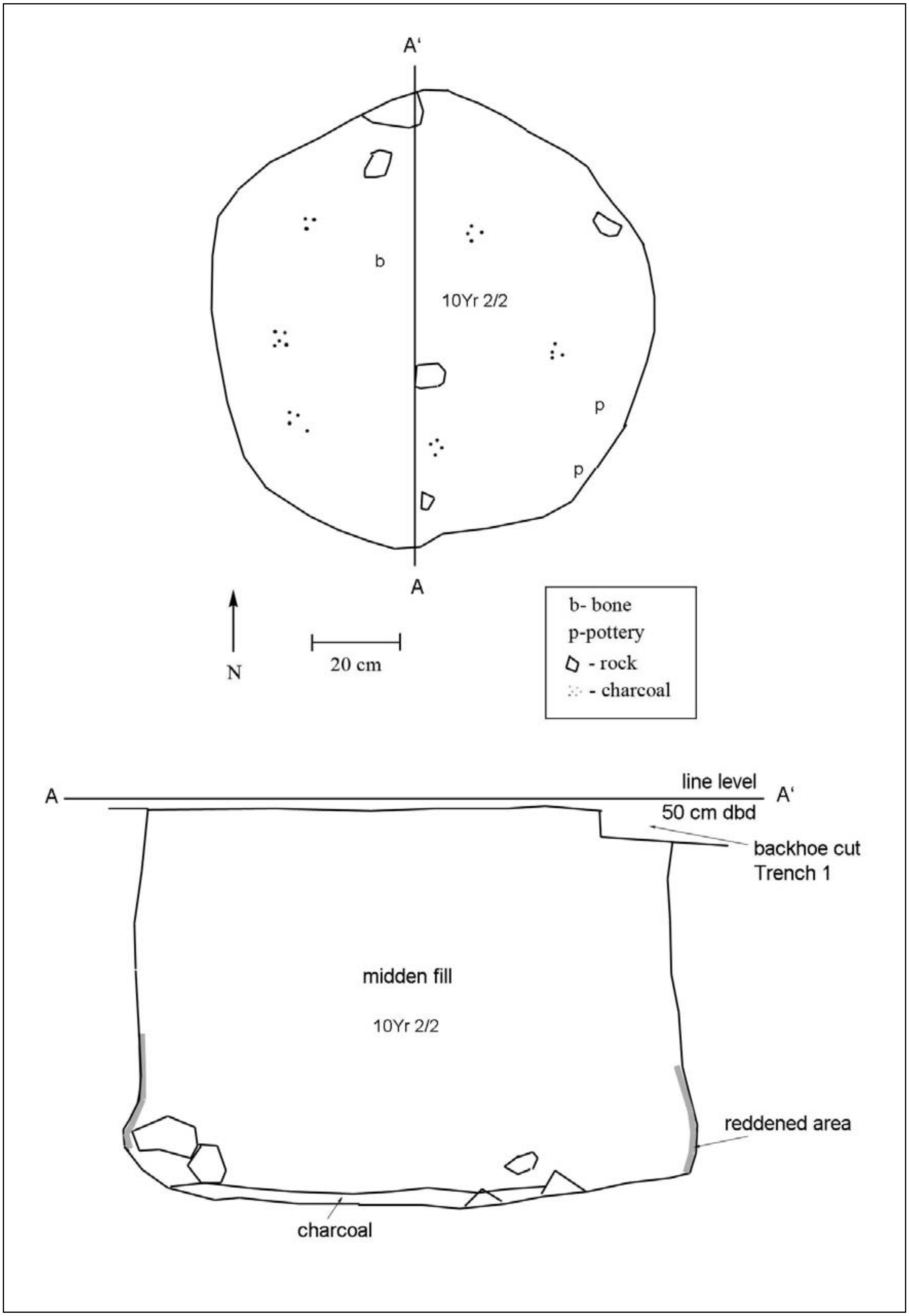

Figure 56. Plan and profile of Feature 7.

Figure 57. Photo of Feature 7.

Figure 58. Photo of Feature 7 profile.

4.3.6.1.8 Feature 8

Feature 8 became apparent during the plow zone removal in Trench 2. The feature was presented as a small circular stain of darker soil and artifacts. The feature measured approximately 66 cm EW x 68 cm NS (Figure 59). The pit was relatively shallow reaching to approximately 51 cm below the present ground surface.

Feature 8 was basin shaped and unlike any of the features excavated at the site (Figure 60). The feature fill consisted of a midden deposit. No stratified deposits were detected. Unique to this feature were the large sherds encountered at the bottom of the feature (Figure 60). The feature contents are summarized in Table 31. Only small pieces of charcoal were recovered during the excavation. No samples were submitted for dating.

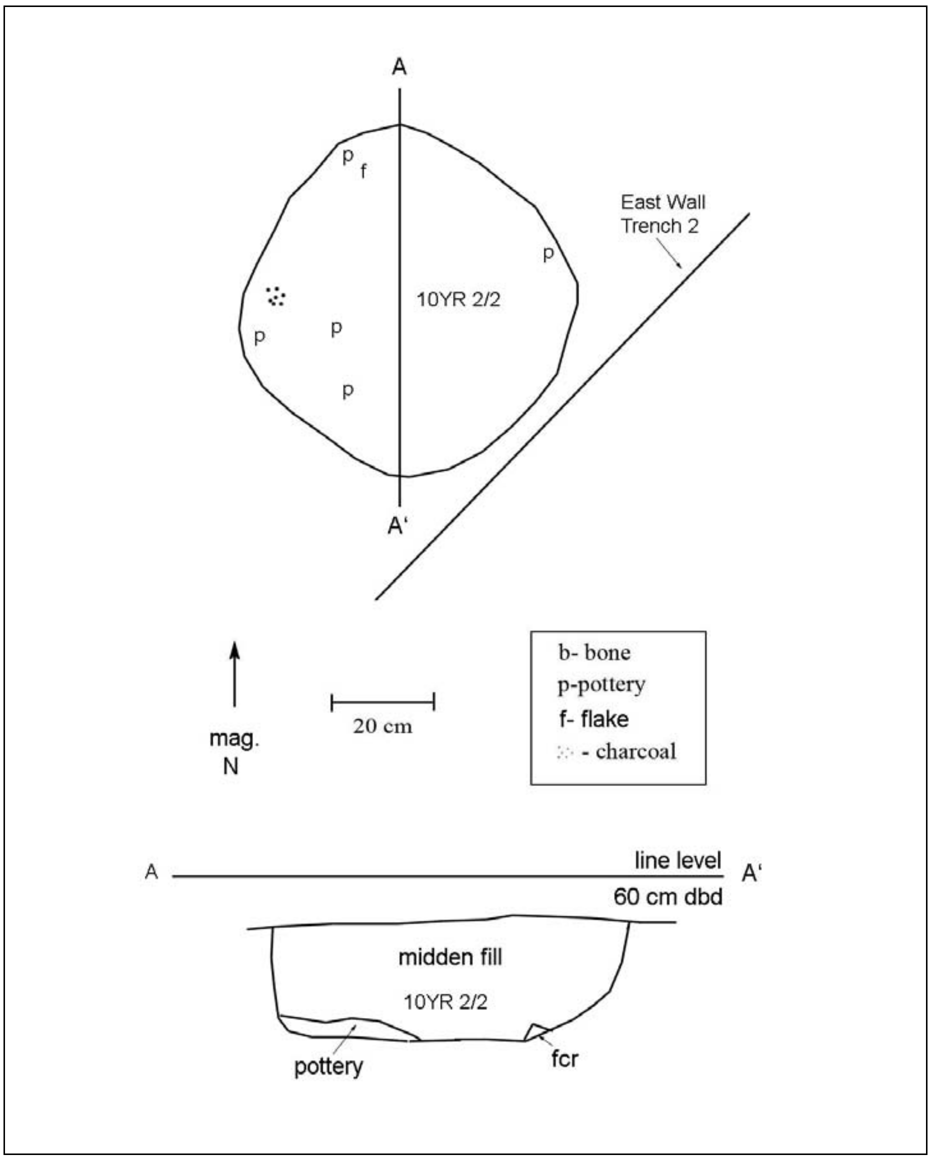

Figure 59. Plan and profile of Feature 8.

Figure 60. Photo of Feature 8.

Table 31 Feature 8 Contents (W ½)								
Level	Depth	Unmodified Flake	Points	Ground Stone	Pottery	Bone	FCR (#/Kg)	Total (w/o FCR)
1	67-77	14			93	31	3/1.5	138
2	77-81	4	1		58	31	2/1.0	95
Total		18	1	1	151	62	5/2.5	233

4.3.6.1.9 Feature 9

Features 9 and 10 were uncovered in the west wall of Trench 1. The backhoe trench cut into the eastern edges of both features. A 1.5 m x 4 m area of plowzone west of Trench 1 was removed to expose the remainder of these features. Feature 9 was located approximately 80 cm south of Feature 10.

Feature 9 was evident as a dark circular stain that contained artifacts. The feature measured approximately 100 cm EW x 112 cm NS (Figure 61). The feature was approximately 97 deep below the present ground surface (Figure 62). The feature was fairly straight sided, but basin shaped at the bottom (Figure 61). The walls of the feature were fire-reddended, but no layer of fire-cracked rock or charcoal was found at the bottom of this feature. There were no distinguishable stratified fill deposits observed. The fill consisted of a midden deposit (Table 32). The fill did contain larger pieces of charcoal that were collected for carbon samples, but were not submitted for radiocarbon dating.

Table 32
Feature 9 Contents (E ½)

Level	Depth	Unmodified Flake	Modified Flake	Points	Ground Stone	Pottery	Bone	Bone Tools	FCR (#/Kg)	Total (w/o FCR)
1	70-80	23				44	3		1/>0.25	70
2	80-90	12				9	4			25
3	90-100	18			1	17	3		7/0.5	39
4	100-110	20	2	1		25	27	1	3/>0.25	76
5	110-125	2				1	1			4
Total		75	2	1	1	96	38	1	11/0.5	214

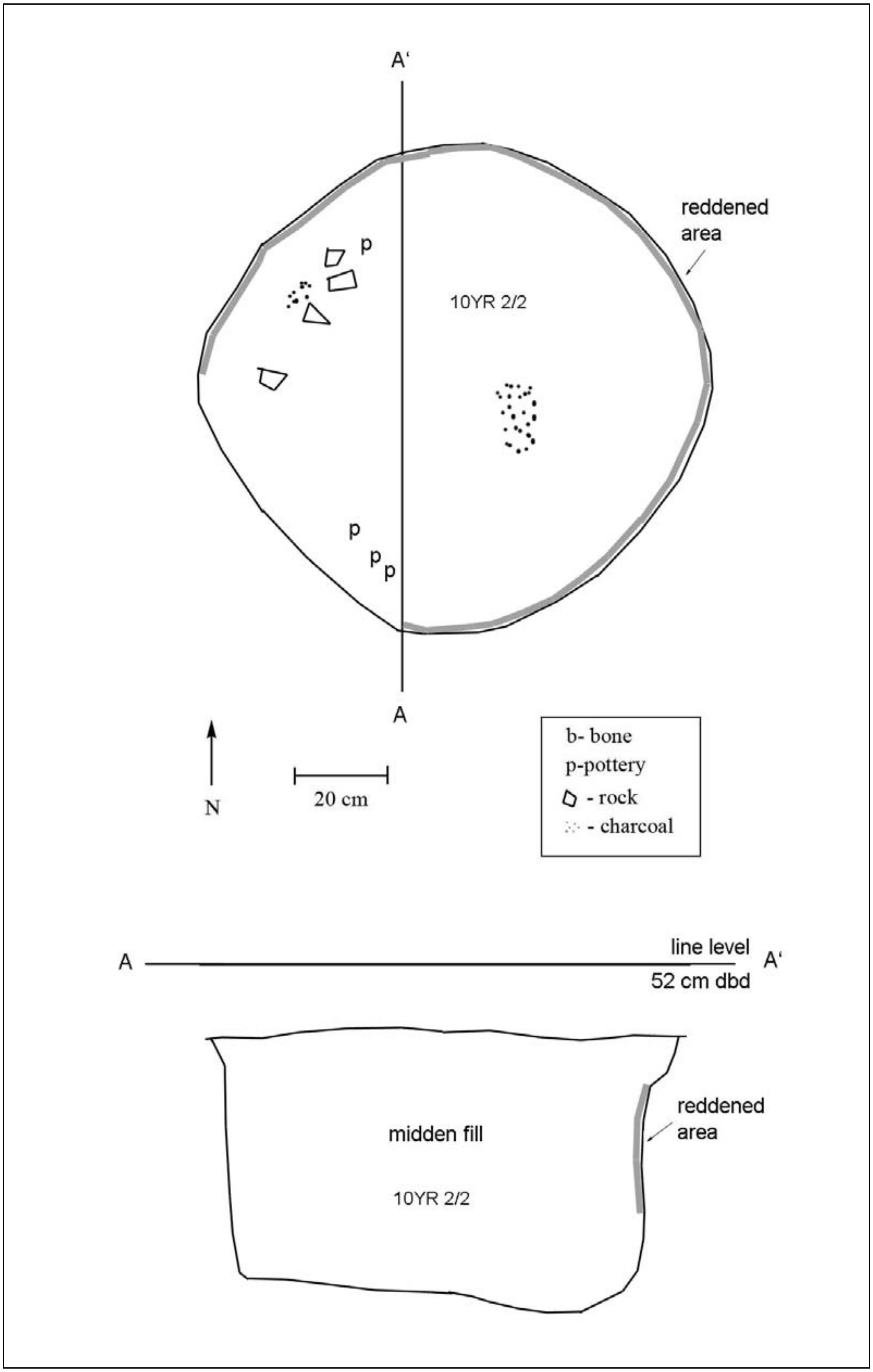

Figure 61. Plan and profile of Feature 9.

Figure 62. Photo of Feature 9.

4.3.6.1.10 Feature 10

Feature 10, like Feature 9, was exposed in the west wall of Trench 1. Feature 10 was exposed as a fire-cracked rock concentration within a dark circular soil stain. The feature measured approximately 114 cm EW x 116 cm NS (Figure 63). With fire-cracked rocks exposed on the surface, we anticipated a shallow feature. However, the feature was approximately 88 cm deep below the present ground surface (Figure 64). The fire-cracked rocks exposed on the surface were apparently a dumping episode within the midden fill.

The western edge of the feature was difficult to define. In level 3 it was recognized that the feature was intersecting with another pit feature, Feature 13 (Figure 65). The area of the intersection was excavated and bagged separately. Levels 1 and 2 of the western side of Feature 10 contained both features. In level 4 the relationship of the two pits was clarified. Feature 10 intruded into Feature 13. Feature 13 was not excavated further.

Feature 10 had fairly straight sides and was basin-shaped at the bottom (Figure 63). The bottom contained a layer of charcoal and fire-cracked rock (Figure 66). Reddened soil indicating burning was apparent along the walls of the feature. The fill of the rest of the feature was a midden deposit (Table 33). Several charcoal samples were taken from the charcoal layer at the bottom of the feature. A sample from Level 6 (113 cm dbd) was submitted for radiocarbon dating. The resultant date was 730 ± 50 BP (Beta-199999).

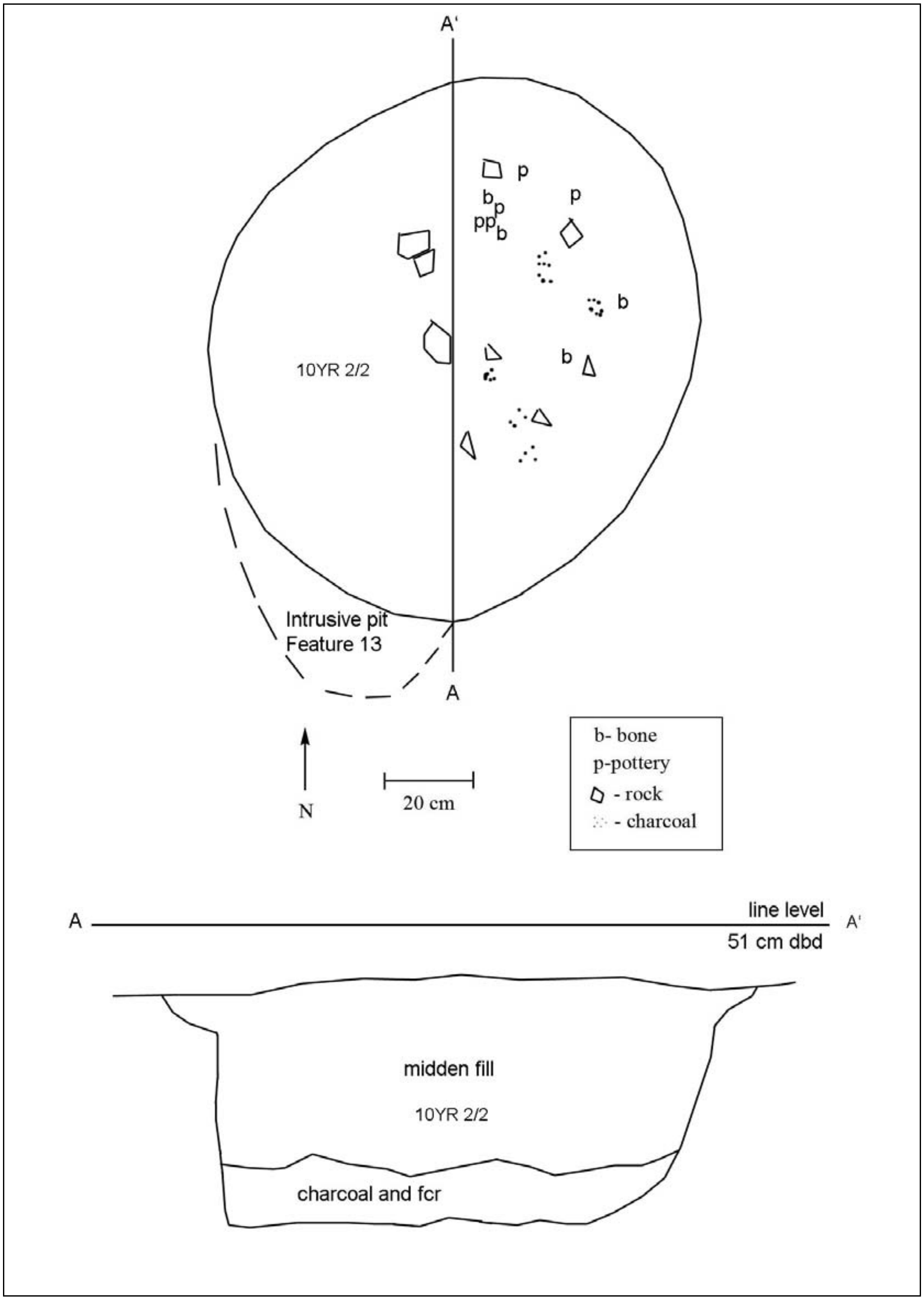

Figure 63. Plan and profile of Feature 10.

Figure 64. Photo of Feature 10.

Figure 65. Intersection of Feature 13.

Figure 66. Photo of Feature 10 profile.

Table 33 Feature 10 Contents (E ½)								
Level	Depth	Unmodified Flake	Perforator	Points	Pottery	Bone	FCR (#/Kg)	Total (w/o FCR)
1	60-70	12	1		77	9	22/1.0	99
2	70-80	25		1	64	49	104/2.5	139
3	80-90	4			21	10	5/1.0	35
4	90-100	7			13	11	12/0.75	31
5	100-110	7			5	11	16/6.5	23
6	110-116						86/29.0	
Wall		7			9	11		27
Total		62	1	1	189	101	245/40.75	354

4.3.6.1.11 Feature 11

Feature 11 was encountered during the plow zone stripping in Trench 1. The feature was not excavated.

4.3.4.1.12 Feature 12

Feature 12 was exposed while clearing the plow zone around Feature 9. It was located to the west of Trench 1 and Feature 9. The feature was not excavated.

4.3.4.1.13 Feature 13

Feature 13 was found during the excavation of Feature 10 (Figure 65). The western margin of Feature 10 was not clearly defined due to an intersecting pit, Feature 13. Feature 10 was intrusive into Feature 13. A small portion of Feature 13 was excavated during the excavation of Feature 10, but the remainder was left intact.

4.3.6.2 Lithic Analysis
by Donald R. Cochran

The analysis of lithic artifacts from 12-H-993 followed the methods used with previous Strawtown projects (Cochran 2002, McCord and Cochran 2003a). The analysis was focused on the excavated and screened half of each feature and does not include the artifacts recovered from flotation. The purposes of the lithic analyses were to provide data to address the research questions enumerated in the research design and provide information on raw material usage, chronology and cultural affiliation in the portion of the site under investigation. In addition, the analysis of triangular points for the current project used an experimental classification method based on changes in hafting of triangular points rather than morphology.

4.3.6.2.1 Methods

A standardized classification system used by ARMS for lithic artifacts was employed (Appendix B). Once cleaned, artifacts were sorted into classes and raw materials identified by ARMS staff. In order to maintain consistency, all classifications were checked by Cochran. All chipped stone raw materials were identified microscopically, at 10X or higher magnification. We maintain that macroscopic classification of chipped stone raw materials is inadequate for identifying raw material types (e.g. Ludke 1992, Tankersley 1985), especially in the glaciated region of Indiana for the reasons specified by Cantin et al. (2003:48,50). Identification of chert types at the Strawtown locality is especially difficulty since Fall Creek chert is highly variable and macroscopically looks like several other cherts such as Flint Ridge, Burlington, Indian Creek, Wyandotte and some fossiliferous cherts (Cochran 2002). Microscopically, Fall Creek chert has a distinctive semitransparent fabric and fossil inclusions that distinguishes it from look-alike cherts. Once the artifacts were catalogued, they were entered into the artifact data base developed for the project (Appendix E).

4.3.6.2.2 Raw Materials

The raw materials used for chipped stone manufacture at site 12-H-993 were analyzed for two primary purposes. First, we wanted to know what nonlocal materials were being used at the site in order to trace possible movements of people between raw material sources. Second, we wanted to define the cultural affiliation of the usage of the local quartzite. Both of these analyses have been addressed to some extent in previous investigations at Koteewi Park sites (Cochran 2002, McCord and Cochran 2003a, Cantin 2003, McCullough et al. 2004).

By far the majority of chipped stone artifacts in features at the site were made from the local Fall Creek chert (Table 34). However, a small percentage of the artifacts were made from distinctive raw materials that can be traced to three source areas located 75 km or more distant: Attica chert, Allens Creek chert, and Indian Creek chert (Table 34). All three of these raw materials have consistently shown up in low percentages in

Koteewi Park sites (Cochran 2002, Cantin et al. 2003, McCord & Cochran 2003a, McCullough et al. 2004). Since these raw materials are also associated with triangular points, the locations of the source areas provide evidence for movement of Late Woodland/Prehistoric people into the Strawtown locality. Given the low percentages of these materials in the 12-H-993 assemblage, their presence most likely represents movement of individuals or small groups rather than wholesale population movements. Since one of the research questions under investigation with the Late Woodland/Prehistoric components at the Strawtown locality is population movement (McCullough et al. 2004), then tracing the movement of raw materials used for chipped stone manufacture is one method for addressing the directions from which populations moved.

Table 34
Chipped Stone Raw Materials in Features at 12-H-993

	F1	F2	F3	F5	F7	F8	F9	F10	Tot	%
Allens Creek	3	3	0	0	5	0	1	0	12	>1
Attica	2	0	3	0	11	0	0	5	21	1
Fall Creek	202	185	67	44	509	17	53	39	1115	77
Indian Creek	0	2	2	1	14	0	2	1	22	2
Quartzite	43	11	11	1	148	0	22	20	256	18
Unknown	2	11	6	2	2	2	0	0	25	2
TOTAL	252	212	89	48	689	19	78	64	1451	100

Two of the three source areas, Attica and Indian Creek, are distinctive and unambiguous in their localities. The Attica source area is almost due west of the Strawtown locality and would require overland movement of at least 75 km from the Wabash River and/or Sugar Creek in Montgomery County to be deposited at the Strawtown locality (Cantin 2005). Indian Creek chert is concentrated in Monroe and Lawrence counties downriver from the Strawtown locality (Cantin 2005). Indian Creek cherts would, therefore, move upriver to reach the Strawtown locality.

Allens Creek chert is primarily distributed in a band stretching from Monroe County south to the Ohio River in Floyd County (Cantin 2005). Like Indian Creek chert, Allens Creek chert from the source area of known outcrops would of necessity move upstream to be deposited at Strawtown. However, there is a possibility that Allens Creek chert could indicate a western connection. Allens Creek chert was identified in stream gravels at the Albee Phase Morrell-Sheets site in Montgomery County (McCord and Cochran 1994) and may be associated with outcrops of the Borden Group (also the source for Attica chert) in that area (Cantin et al. 2003:51). To date, no outcrops of Allens Creek chert have been identified in western Indiana (Cantin 2005). Thus, the Allens Creek chert at 12-H-993 is somewhat ambiguous as an indicator for direction of movement. However, the greatest likelihood would seem to be from downriver given the presence of triangular points made from fossiliferous cherts (most likely Allens Creek chert) on Oliver Phase sites in Marion, Morgan and Johnson Counties south of the Strawtown locality (Cochran 2002:222).

In addition to movement of people indicated by the presence of distinctive raw materials, we also wanted to continue the investigation of the association and usage of the local quartzite with components represented at the site (Cochran 2002:225, McCord and Cochran 2003:48). White et al. (2003:224, McCullough et al. 2004:338) have hypothesized that the quartzite raw material at the Strawtown locality is associated with the “early” Oliver component dating between A.D. 1200 and 1300 at the Strawtown enclosure. This early component is associated with Ft. Ancient ceramics (White et al. 2003:225). Cochran has been informally investigating a hypothesis that the quartzite is associated with the Bowen ceramics but the lack of clear feature contexts from excavated sites has hampered this investigation. Since we had good feature contexts and associated radiocarbon dates, we tabulated the occurrence of quartzite artifacts in feature assemblages for comparison with other sites. Table 34 shows the distribution of quartzite artifacts in features at 12-H-993 and shows that 18% of the chipped stone artifacts recovered during our excavations were made from this material. By comparison, Table 35 shows the distribution of quartzite artifacts in feature context from other investigations in the Park.

Table 35
Raw Material Distribution in Features

MATERIAL	12-H-3	12-H-883	12-H-1052	ISU F1*	12-H-993	TOTAL
Allens Creek	4	10	0	2	12	28
Attica	0	0	0	19	21	40
Indian Creek	78	4	0	0	22	104
Quartzite	43	155	0	29	256	483
Other	1658	1770	7	726	1140	5301
TOTAL	1783	1939	7	776	1451	5956

* ISU excavation of F1 at 12-H-993 (Cantin et al. 2003)

The fact that there were no Ft. Ancient ceramics recovered from 12-H-993 during our excavations and that the range of radiocarbon dates spanned the Bowen component, it appears that the hypothesis of association of quartzite use with the Bowen component is supported. In addition, Indiana State University excavated a feature (Feature 1) within 12-H-993 and recovered Bowen ceramics, quartzite and an associated radiocarbon date (Cantin et al. 2003) that further supports the hypothesis. While ISU originally reported four sherds as having trailed lines, a reexamination of the ceramics by Beth McCord was unable to confirm an association between the trailed lines and Ft. Ancient ceramics. At least in feature context at site12-H-993, the association between usage of quartzite for chipped stone tool manufacture and the Bowen ceramics is confirmed. However, additional contextual support from features is needed to lend credence to this hypothesis. Completion of a lithic analysis for the 2002 Strawtown enclosure excavation would be of great benefit to this analysis (White et al. 2003).

4.3.6.2.3 Lithic Artifacts

A total of 1455 lithic artifacts were recovered from the screened half of features at 12-H-993. Table 36 shows the distribution of artifact classes represented in the features. The distribution of lithic artifacts is interesting for the high numbers recovered from

Feature 7 and the low numbers of artifacts recovered from the other features of similar size and fill composition (F1, F2, F3). Unmodified flakes were the most frequently encountered lithic artifacts while bifaces, biface fragments, perforators, other chipped stone and ground stone occurred in very low frequencies. Taken together, points and point fragments occurred in every feature. The low numbers of cores and biface/biface fragments suggest that limited manufacturing was represented in the feature fill, but the high numbers of unmodified flakes are contradictory. It seems that core reduction was carried out on the site but that flakes were selected and discarded in the midden in disproportional numbers to cores. In other words, the lithic artifacts suggest that the midden deposited in the features was somewhat specialized rather than representing a generalized deposit of generalized site activities.

Table 36
Lithic Artifacts/Feature Associations

Class	F1	F2	F3	F5	F7	F8	F9	F10	Total
Unmodified flake	242	207	85	45	661	18	75	62	1395
Modified flake	0	0	0	0	12	0	2	0	14
Block flake	1	0	0	0	0	0	0	0	1
Core	3	3	1	2	2	0	0	0	11
Biface	0	1	0	0	0	0	0	0	1
Biface fragment	0	0	0	0	0	0	0	0	0
Bipolar artifact	2	0	0	0	4	1	0	0	7
Point	2	1	2	0	3	0	1	1	10
Point fragment	2	0	1	1	4	0	0	0	8
perforator	0	0	0	0	3	0	0	1	4
Other chipped stone	0	0	0	0	2	0	0	0	2
Ground stone	1	0	0	0	0	0	1	0	2
TOTAL	253	212	89	48	691	19	79	64	1455

4.3.6.2.31 Points

Points were the only diagnostic lithic artifact recovered from feature contexts. The base of a Matanzas point (Justice 1987:119-120) was recovered from F7, but the other 8 points were triangular (Justice 1987:224) (Figure 67). Two of the point fragments were triangular point bases, six of the point fragments were blades and distal ends of triangular points and the remaining two point fragments were too small to associate to a point class. Overall, 16 of the 18 points and point fragments identified in feature context at 12-H-993 dated to the Late Woodland/Prehistoric occupation of the site. The base of the Matanzas point appeared most likely to represent an earlier component at the site that was incorporated into the feature fill during redeposition.

Figure 67. Points found in Features.

In addition to the standard classification of triangular points (e.g. Justice 1987), the points from features at 12-H-993 were examined from an experimental approach. Triangular points are generally perceived as lacking formal variation except for the morphology of the base and blade edges (Justice 1987, Railey 1992). Most current typological schemes for triangular points are based on morphological variation in the outline of the points (e.g. Railey 1992, Litfin et al.1993). Typological schemes have also relied on statistical analyses to define chronological and cultural differences in triangular points (e.g. Seeman & Munson 1980). These schemes are unsatisfactory for three primary reasons.

1. Triangular points primarily enter the archaeological record as a result of replacing worn out and broken points. While some pristine points certainly enter the archaeological record as a result of losses, caching or as mortuary associations, it can be reasonably assumed that these points are the exception rather than the rule.
2. Both morphological and statistical typologies require whole or nearly whole points (Seeman and Munson 1980, Railey 1992, Litfin et al. 1993, Wright 2004). Triangular points, like other chipped stone projectiles and knives, follow a reductive continuum as a result of resharpening until the point is either broken or no longer functional. Points may break anywhere along the resharpening continuum and would thus display morphological variability depending upon the

amount of resharpening that took place prior to breakage. Limiting triangular point typologies to whole points limits the inclusion of only whole worn-out or otherwise defective points or losses. Except in rare cases such as mortuary context (e.g. Wright 2004), broken triangular points far exceed whole triangular points in assemblages. Thus typologies that rely on complete or nearly complete points are biased and do not reflect the full range of variation within the points.

3. Contexts for triangular points are usually poorly controlled. Points recovered from surface contexts are inadequate for establishing typologies because of the potential for mixing components and even triangular points from mortuary contexts appear unlikely to represent the range of variation present within a triangular point type (Wright 2004). In order to be valid, triangular point typologies must be devised from tightly controlled feature context and associated with radiocarbon dates and/or other diagnostic artifacts.

One promising method for refining triangular point typologies is the investigation of hafting technology (Yerkes and Pecora 1991). Over the past several years Cochran has been examining triangular points in order to establish changes in hafting technologies that are chronologically sensitive (Cochran 2003). One advantage of such a system is that both whole and broken triangular points can be classified as long as enough of the base remains to identify the hafting method. Unlike notched or stemmed points, the hafting technology of triangular points is a result of resharpening of the blade. As the blade is reduced, the portion of the base of the point that is either tied or glued into the end of the arrow shaft remains unchanged. A single resharpening of the blade of a triangular point is enough to define the hafting area.

To date, three hafting technologies have been identified (Figure 68). For convenience, these three technologies are discussed as Early, Middle and Late triangular points. The apparent earliest hafting technology, the Early type, for triangular points involves binding the point into the arrow shaft by just catching the corners of the base of the point. Under magnification, these corners are usually ground. Resharpening of the blade edges results in a deeply incurved blade morphology with a sharp corner. Examples of this type of hafting technology includes Hamilton Incurvate (Justice 1987:229) and Levanna (Justice 1987: 228). Many points of this kind are frequently broken across the basal corners, probably as a result of the point rotating in the haft and the strain generated by the binding. These points are the earliest in the triangular point cluster and are expected to date up to ca. AD 1000 (Justice 1987:228-230).

The second or Middle type of hafting technology involves binding the triangular point into the arrow shaft by wrapping the binding up the lower sides of the blade (Yerkes and Pecora 1991:103) (Figure 68). Points with this hafting technology assume a pentagonal morphology with resharpening – the more resharpened, the more obvious the pentagonal form. These points are most often broken just ahead of the binding and rarely if ever are the lower corners broken off. These points are expected to date from about AD 1000 to AD 1300.

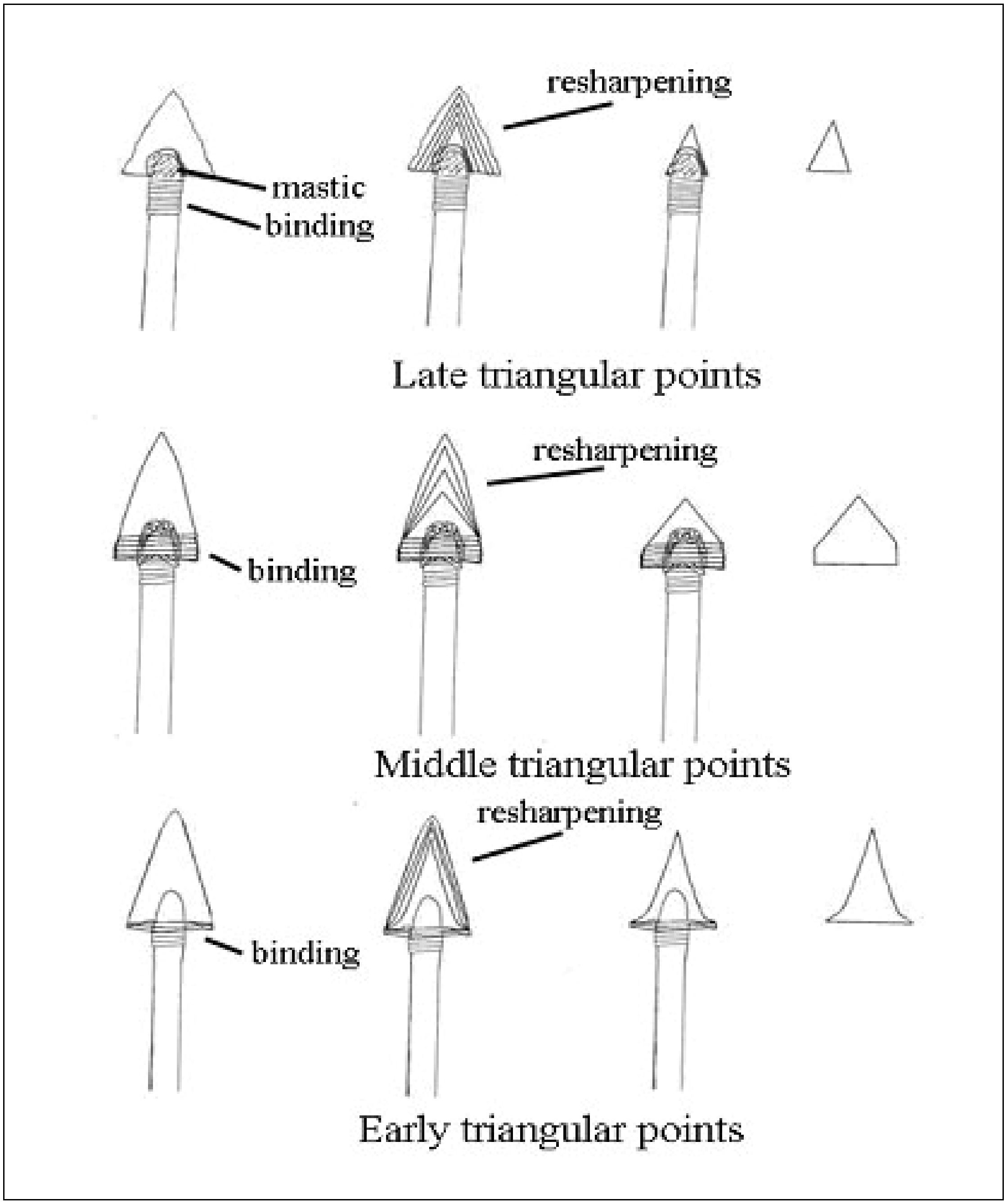

Figure 68. Point classification.

The third or Late type of hafting technology involves points that are not bound into the haft. These points are most likely glued into the slot in the end of the arrow shaft (Yerkes and Pecora 1991:103). Resharpening of these points involves the whole length of the blade edge and no hafting area is discernable. In addition, incurvate blade edges do not occur. Resharpening creates a point that is narrower at the base than either of the other two types; the only limitation to the final size of the base of the point is the size of the arrow shaft. These points are expected to occur later in the sequence – after AD 1300 and most likely relate to the Oneota occupation at the Strawtown locality.

As currently envisioned, hafting technology changed through time and is currently defined to correlate with ceramic horizons. Further, it is assumed in this investigation that regional variation occurred and that it is unreasonable to expect that triangular points from the Ohio Valley are morphologically or technologically equivalent to triangular points from the Great Lakes. This expectation means that in places such as the Strawtown locality where several traditions overlap in time and space, triangular point typologies may display considerable variation. In addition, since the three "types" are defined as horizon markers, some archaeological units could include two hafting technologies. For instance, given the current chronology for the Albee Phase, the early part of the phase would be associated with the early triangular points and the later part of the Phase would be associated with the middle triangular points.

Prior to applying this typology to the triangular points at 12-H-993, it was expected that, based on diagnostic ceramics and radiocarbon dates, the majority of the points would be of the Middle type. No Late type triangular points were expected and few, if any of the Early type. If Early type triangular points occurred in the features, they were expected to be associated with F9 where the Albee rims were found.

The analysis of triangular points was limited to whole points and base fragments, a sample of 10 points. The results of the classification are shown in Table 37. As predicted, no Late type points were in the sample. The majority (No. = 7 or 70%) of the points were of the Middle type and the minority (No. = 3 or 30%) were of the Early type.

The Middle type triangles were contained in Feature 2 and Feature 7 with associated radiocarbon dates ranging between cal AD 1030 to 1280 (see Radiocarbon Dates section). These dates were consistent with the expectations between the Middle type triangles and associated dating. One of the Early type triangles was recovered from Feature 9 and the remaining two Early type triangles were found in Feature 3. Feature 9 was not dated and the ceramics in the feature were all Bowen series. Feature 3 had an associated radiocarbon date of cal AD 1220 to 1400 (see Radiocarbon Date section) but the feature fill also contained one rim sherd that was Albe-like. Overall, the typology appeared to work for the Middle type Triangles but was ambiguous for the Early type triangles. Further testing of the typology will be undertaken with the triangular points recovered from the feature flot samples.

Table 37
Triangular Point Classification/Feature Association

Class	F1	F2	F3	F5	F7	F8	F9	F10	Total
Late	0	0	0	0	0	0	0	0	0
Middle	2	2	0	0	2	1	0	0	7
Early	0	0	2	0	0	0	1	0	3
Total	2	2	2	0	2	1	1	0	10

In addition, the triangular point typology was compared with raw material associations to further investigate the association between quartzite, Attica, Indian Creek and Allens Creek cherts in Late Woodland/Prehistoric components at the Strawtown locality. The sample of triangular points from the features did not contain points of Attica chert or Allens Creek chert. Two points were made from quartzite and one from Indian Creek chert. The two quartzite points were split between an Early type and a Middle type triangle and the Indian Creek chert point was a Middle type triangle. The Middle type triangles were associated with Features 3 and 7, both with radiocarbon dates spanning the cal. AD 1160 to 1400 period. These data were not sufficient for defining the association between the triangular point classification and specific raw material sources.

Overall, the experimental classification system of triangular points was supported but some ambiguity remains. The Middle type points were associated with radiocarbon dates that fit the expected range. The Early type triangles were not well represented and were in ambiguous contexts. Further testing of the classification system will be employed with the triangular points from the floted samples from the features.

4.3.6.2.4 Summary

Lithic artifacts recovered from the screened half of features excavated at 12-H-993 contained little diversity and few formal tools. In addition, the lithic artifacts suggested that the midden deposits in the features was somewhat specialized and did not reflect a generalized deposit of site activities in terms of the lithic artifacts present. Raw materials indicated movement of small groups of people from over 75 kilometers away including from the west and upriver from the south. Diagnostic lithic artifacts were restricted to points. One Late Archaic Matanzas point fragment was present, apparently a result of redeposition of an earlier component incorporated into the midden deposit. Triangular points diagnostic of Late Woodland/Prehistoric were the majority of diagnostic artifacts present. An experimental classification system showed that the majority of the triangular points were related to the AD 1000 to 1300 period and most likely associated with the Bowen component at the site.

4.3.6.3 Pottery Analysis

The pottery analysis from site 12-H-993 utilized sherds recovered from the screened portion of the excavated features. The analysis represents an approximate 50% sample of the material culture in the features, although Feature 1 is somewhat less. Sherds recovered from the surface or in the units were not included due to the disturbed context and they were previously discussed under the Controlled Surface Collection and Units sections.

4.3.6.3.1 Methods

All pottery from the screened half of the features were initially sorted by form: rim, neck or body. Sherds that were missing the lip section, but still recognizable as a rim section based on a rim strip or collar, were identified as rims. Sherds with an excurvate profile and no rim attributes were classified as necks. All other sherds were classified as body sherds. The sherds were also sorted by surface treatment: cord marked, fabric marked, smooth/plain, or exfoliated/eroded. Cord marked or fabric marked surfaces included surfaces that may or may not be smoothed but were still identified with cord of fabric impressions. Smooth/plain sherds had even surfaces and if cord or fabric impressions had been made they were obliterated. Exfoliated/eroded sherds had surfaces that were not distinguishable either due to exfoliated or eroded surfaces. The kind of temper added to the paste was recorded: grit or shell. Grit temper consisted primarily of mafic or felsic minerals derived from igneous rock. Shell tempering consisted of crushed shell or leached shell leaving flat cavities. Decoration or embellishments were noted if present.

Further analysis of rims and decorated sherds was undertaken. This analysis included rims or decorated sherds that were provenienced and recovered from the flotation sample (half) of the feature. The analysis of rims and decorated sherds was conducted by vessel counts rather than individual sherd counts since several refits occurred. Due to the inclusion of flot sample ceramics and analysis by vessel count, the number of sherds listed in the tables below does not match. This analysis included recording the rim profile, rim additions, lip shape, decorative placement, decorative techniques, decorative motifs, rim diameter, rim thickness, rim addition height, lip thickness, neck thickness, and body thickness as applicable. Appendix F provides a definition of the attributes recorded and the analysis data.

4.3.6.3.2 Results

Over 2100 sherds were recovered from the screened half of the features. Table 37 provides a listing of pottery forms recovered by feature. It is not surprising that the majority of the sherds were identified as body sherds. Table 38 provides a listing of surface treatments. Of the 1190 sherds with identified surface treatments, 55.0% were fabric marked, 30.2% were cordmarked and 14.8% were smooth/plain. Since grit was the overwhelming tempering agent, data was not presented in a Table. Only 42 sherds (1.9%), all body forms, were shell tempered. Shell tempered sherds occurred in all features, except Feature 5 and Feature 8. The more detailed analysis of the rims and decorated sherds by feature are provided below.

Table 37 Pottery Form by Feature (screened sample)				
Feature	Body	Neck	Rim	Total
Feature 1 (E ½)	375	14	11	400
Feature 2 (E ½)	200	18	8	226
Feature 3 (E ½)	111	1	3	115
Feature 5 (E ½)	77	0	3	80
Feature 7 (E ½)	868	10	21	899
Feature 8 (W ½)	141	3	7	151
Feature 9 (E ½)	94	0	2	96
Feature 10 (E ½)	178	7	4	189
Total	2044	53	59	2156

Table 38 Pottery Surface Treatment by Feature (screened sample)					
Feature	Fabric Marked	Cord Marked	Smooth/ Plain	Eroded/ Exfoliated	Total
Feature 1 (E ½)	100	47	32	221	400
Feature 2 (E ½)	90	52	26	58	226
Feature 3 (E ½)	43	24	17	31	115
Feature 5 (E ½)	12	25	0	43	80
Feature 7 (E ½)	290	101	55	453	899
Feature 8 (W ½)	9	75	20	47	151
Feature 9 (E ½)	33	12	9	42	96
Feature 10 (E ½)	78	23	17	71	189
Total	655	359	176	966	2156

4.3.6.3.2.1 Rim Analysis

A total of 75 vessels were identified from the rim sections found in the features. All but one vessel appeared to represent globular jars. One vessel from Feature 2 was identified as a bowl. Excluding the bowl, the jar rims ranged in size from 16 to 38 cm in diameter. The average size was 24.4 cm. There were four types of clay additions that thickened the rim: rim strips, rim fold, collars or extruded lips. The average rim thickness and height of added rim bands are presented in Table 40. A summary of rim attributes by feature follows.

Table 40 Rim Measurements				
Rim Addition Form	Average Max. Thickness (mm)	Range	Average Max. Height (mm)	Range
Rim strip	9.62	6.66 to 12.67	25.45	7.44 to 39.93
Rim fold	7.8	7.06 to 8.39	9.28	7.67 to 11.31
Collar	9.61	8.20 to 10.71	15.39	14.24 to 16.54
Extruded lip	9.08	7.66 to 10.16	n/a	n/a

Feature 1. The analysis of Feature 1 rims resulted in the identification of 20 vessels (Figures 69-72). Three sherds originally identified as decorated body sherds were reclassified as rim sherds and included this analysis. A summary of attributes recorded for rims from Feature 1 are listed in Table 41. Surface treatments were a mix of fabric marked, cord marked and smooth/plain techniques, but smooth treatments were most common. Five of the vessels showed differences in the surface treatment between the rim and neck portions. Rim portions may be fabric marked and necks smoothed or vice versa. The majority of the vessels had straight rim profiles. Half of the vessels had the addition of a rim strip, while some had no additions. Half of the vessels were decorated on the rim and/or the lip. The most common decorative elements on the rim were linear cord impressions and these were most often some form of horizontal line. The dentate stamp of Vessel 9, is the only non-cord decoration found on the vessels from Feature 1. The lip forms were predominately flat. While less than half of the vessels had decoration on the lip, 2 vessels were missing the lip section. The dominant lip decoration was cord impressed obliques. This style occurred on every decorated lip, except Vessel 9, which had the dentate stamp. The only castellations occurred on Vessel 19. The vessel forms appeared to be consistent with jars. The vessels with measurable rim diameters ranged between 21 and 28 cm.

Figure 69. Feature 1 pottery, Vessels 1-13.

Figure 70. Feature 1 pottery, Vessels 14-18.

Figure 71. Feature 1 pottery, Vessel 19.

Figure 72. Feature 1 pottery, Vessel 20.

Table 41 Feature 1 Rim Attributes										
Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration	Castellation
1	FM	FM	Straight		None	None		Flat		
2	FM	FM	Straight		None	None		Flat		
3	CM	CM	Straight		Rim fold	None		Pointed		
4	FM	S/P	Straight		Rim strip	None		Flat		
5	S/P	S/P	Straight		Rim strip	Rim	Linear CI – oblique rows	Flat		
6	S/P	S/P	Straight		Rim strip	Rim and lip	Linear CI – horiz. over obliques	Flat	CI - obliques	
7	S/P	FM	Straight		Rim strip	Rim and lip	Short CI close – horiz rows	Flat	CI - obliques	
8	S/P		Straight		Rim strip	Rim and lip	Linear CI – horiz rows	Flat	CI - obliques	
9	S/P	FM	Straight	Yes	Rim strip	Rim and lip	Dentate stamp – horiz line with obiques	Flat	Dentate stamp – obliques	
10	FM		Sharp everted		Rim strip	Rim	Linear CI – obique rows	n/a		
11	S/P		Straight		None	None		Pointed		
12	S/P		Straight		None	None		Flat		
13	CM		Sharp everted		None	None		Flat		
14	S/P		Straight		None	None		Flat		
15	S/P		Straight		Extruded	None		Bev ext		
16	FM	S/P	Straight		Rim strip	None		Flat		
17	ER/EX		Unknown		Unknown	Rim	CI – unk	n/a		
18	S/P		Straight		Unknown	Rim and lip	Linear CI – unknown	Flat	CI – obliques	
19	S/P	FM	Straight		Rim strip	Rim and lip	Linear CI – horiz rows	Flat	CI – obliques	Yes
20	FM	FM	Straight		Rim strip	Rim and lip	Linear CI – obliques	Flat	CI – obliques	

Feature 2. The analysis of Feature 2 rims resulted in the identification of 15 vessels (Figures 73 & 74). This included a vessel from a discrete dumping episode within the midden identified as Feature 2A. Two sherds originally identified as decorated body sherds were reclassified as rim sherds and included in this analysis. A summary of attributes recorded for rims from Feature 2 are listed in Table 42. Surface treatments were a mix of fabric marked, cord marked and smooth/plain techniques, but smooth treatments were most common. Two vessels showed differences between the surface treatment of the rim portion and neck portion of the vessel. Straight rim profiles were dominant in the sherds from Feature 2. All of the vessels, except Vessel 32, were consistent with jar forms. Vessel 32 had an incurvate profile and appeared to represent a bowl. Eight vessels had no additions, three had rim strips and 2 had rim folds. Nine of the vessels were not decorated. Six vessels were decorated either on the rim and/or lip sections. Cord impressions were the most common decorative technique occurring as oblique rows, horizontal rows or in one case, Vessel 25, combinations of both. Vessel 22 had linear tool impressions on the rim and Vessel 24 had square punctates on the lip. Rim diameters for the jars ranged between 20 and 26 cm. Vessel 32, a bowl form, had a rim diameter of 15 cm. A bowl section of an untempered pipe (Figure 74) was also recovered from Feature 2. It was decorated with incised lines that were vertical, horizontal and oblique.

Figure 73. Feature 2 pottery, Vessels 21-30.

Figure 74. Feature 2 pottery, Vessels 31-35 and pipe.

Table 42 Feature 2 Rim Attributes									
Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration
21	S/P		Straight		Rim fold	Lip		Flat	CI – line
22	S/P		Straight		Unknown	Rim and lip	Linear TI – horiz rows	Notched	I – oblique
23	S/P		Unknown		Unknown	Rim	Short CI – horiz line	n/a	
24	S/P		Unknown		Unknown	Rim	Short CI – horiz line	Bev ext	Punctate (square)
25	S/P		Straight		Rim strip	Rim and lip	Linear CI - horiz row over oblique rows	Channel	CI – line
26	S/P	FM	Straight		Rim strip	Rim	Linear CI – oblique rows	n/a	
27	S/P	CM	Straight		Rim fold	None		Bev ext	
28	FM		Straight		None	None		Flat	
29	S/P		Straight		None	None		Bev ext	
30	FM		Straight		None	None		Flat	
31	CM	S/P	Straight		Rim strip	None		Flat	
32	CM	CM	Incurvate		None	None		Flat	
33	FM		Straight		None	None		Round	
34	CM		Straight		None	None		n/a	
35	FM		Mod everted		None	None		Bev ext	

Feature 3. The analysis of Feature 3 rims resulted in the identification of five vessels (Figure 75). A summary of attributes recorded for rims from Feature 3 are listed in Table 43. The most common surface treatment was a smoothed surface. Vessel 39 showed differential treatment of the rim section that was fabric marked and the neck portion that was smoothed. Only three of the vessels were complete enough to determine the rim profile and these were all straight. Rim additions where identifiable were present on one vessel with a collar and one vessel with an extruded lip. Given the high instance of rim strips in other features, it was surprising that none occurred in the fill of this feature. Decoration occurred on three vessels appearing as short cord impressions on the rim of Vessel 37, tool impressed notches on the lip of Vessel 40 creating and scallop effect, and incised vertical rows on the collar/neck area of Vessel 36. Two rims had measurable diameters of 16 and 26 cm. The vessel forms all appeared consistent with jar forms.

Figure 75. Feature 3 pottery, Vessels 36-40.

Table 43 Feature 3 Rim Attributes									
Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration
36		CM	Unknown		Collar	Neck	Incised – vertical row	n/a	
37	S/P	S/P	Unknown		Unknown	Rim	Short CI -	n/a	
38	S/P		Straight		Unknown	None		Flat	
39	FM	S/P	Straight		Extruded	None		Bev ext	
40	S/P	S/P	Straight		None	Lip		Notched	TI notch – scalloped lip

Feature 5. The analysis of Feature 5 rims resulted in the identification of four vessels (Figure 76). A summary of attributes recorded for rims from Feature 5 are listed in Table 44. Two of the vessels, Vessels 41 and 42, were cord marked and had collars. Two of the vessels, Vessels 43 and 44, were fabric marked and had rim strips. Vessel 41 had vertical tool impressions on the collar and incised notches on the inner rim. Vessel 42 had vertical incised lines on the collar and tool impressions on the inner rim. Vessel 43 had square punctuates on the lip surface. Vessel 44 had one horizontal cord impressed row on the rim strip and a cord impressed channel on the lip. Vessels 43 and 44 were large enough to measure rim diameters of 26 and 28 cm, respectively. The vessel forms appear consistent with jars.

Figure 76. Feature 5 pottery, Vessels 41-44.

Table 44
Feature 5 Rim Attributes

Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration
41	CM	CM	Straight		Collar	Rim and lip	Linear TI – vertical row	Flat	I – inner rim notch
42	CM	CM	Straight		Collar	Rim and lip	Incised – vertical row	n/a	TI – inner rim impressed
43	FM	FM	Straight		Rim strip	Lip		Flat	Punctate – square
44	FM	FM	Straight		Rim strip	Rim and lip	Linear CI – horiz row	Channel	CI – line

Feature 7. The analysis of Feature 7 rims resulted in the identification of 13 vessels (Figures 77 & 78). A summary of attributes recorded for rims from Feature 7 are listed in Table 45. Surface treatments were most commonly smoothed. Two vessels showed differences between the surface treatment of the rim portion and neck portion of the vessel. Most of the vessels had a straight profile. Vessel 51 was somewhat unique since the rim was also cambered. Rim strips were the most common addition occurring on 5 vessels. Eight of the vessels had some form of decoration occurring either on the rim and/or lip portion of the vessel. Linear cord impressions in oblique rows or in a horizontal line were the most popular motifs on the rim. Vessel 57 was unique in the site assemblage having incised crosshatched decoration on the exterior of the rim. Four lips were decorated with cord impressions forming either an oblique line or a channel in the lip and one vessel also had a line of tool impressions. The only sherd from the site that had a vertical node/lug was on Vessel 51. The vessel was also castellated with the peak directly above the lug. Rim diameters ranged between 22 and 30 cm. The vessels were consistent with jar forms.

Figure 77. Feature 7 pottery, Vessels 54-53.

Figure 78. Feature 7 pottery, Vessels 54-57.

Table 45 Feature 7 Rim Attributes										
Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration	Castellation
45	S/P		Straight		None	None		Pointed		
46	S/P	S/P	Straight		Rim strip	None		Flat		
47	S/P		Straight		None	None		Flat		
48	S/P	CM	Sharp evert		None	None		Flat		
49	CM	CM	Sharp evert		None	None		Bev ext		
50	FM		Straight		Extruded	Lip		Bev ext	CI – obliques	
51	S/P	S/P	Straight	Yes	Rim strip	Rim and lip	Linear CI – horiz rows interrupted	Channel	CI – line	Yes
52	ER/EX		Straight		Extruded	Lip		Flat	TI – line on lip and CI – oblique on inner rim	
53	S/P	S/P	Straight		Rim Strip	Rim	Linear CI – oblique rows	n/a		
54	S/P		Unknown		Rim strip	Rim	Linear CI – oblique rows	n/a		
55	S/P		Straight		Unknown	Rim	Trailed – oblique rows	n/a		
56	S/P	S/P	Straight		Unknown	Rim	Linear CI – oblique rows	n/a		
57	S/P	FM	Straight		Rim strip	Rim and lip	Incised – crosshatching	Flat	CI – obliques	

Feature 8. The analysis of Feature 8 rims resulted in the identification of five vessels (Figures 79 & 80). A summary of attributes recorded for rims from Feature 8 are listed in Table 46. The surface treatments applied to the vessels was most commonly smoothed/plain. The only differential treatment between rims and necks occurred with Vessel 58. Three of the vessels had straight profiles and two were moderately everted. A rim strip had been added to three of the vessels. Two of the vessels were decorated. Vessel 60 had horizontal rows of cord impressions on the rim strip and cord impressed obliques on the lip. Vessel 62 had tool impressions of one horizontal row on the rim strip and one horizontal row below the strip which was unusual. The rim diameters, based on two vessels, ranged between 26 and 32 cm. The vessels were consistent with jar forms.

Figure 79. Feature 8 pottery, Vessel 58.

Figure 80. Feature 8 pottery, Vessels 59-62.

Table 46 Feature 8 Rim Attributes									
Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration
58	S/P	CM	Mod everted		Extruded	None		Flat	
59	FM	FM	Straight		Rim strip	None		Flat	
60	S/P		Straight		Unknown	Rim and lip	Linear CI – horiz rows	Flat	CI – obliques
61	FM	FM	Straight		None	None		Flat	
62	S/P	S/P	Mod everted		Collar	Rim	TI – horiz rows	Flat	

Feature 9. The analysis of Feature 9 rims resulted in the identification of five vessels (Figure 81). A summary of attributes recorded for rims from Feature 9 are listed in Table 47. Surface treatments for vessels from Feature 9 were either fabric marked or smoothed/plain. Vessel 63 showed differential treatment between a smoothed/plain rim and fabric marked neck. Of the identifiable rim profiles all of the vessels were straight. Two of the vessels had rim strips. Vessel 63 was decorated with circular punctuates. Vessel 65 had 2 horizontal rows of linear cord impressions on the rim strip and cord impressed obliques on the lip. None of the vessels were large enough to measure rim diameters. All of the vessels were consistent with jar forms.

Figure 81. Feature 9 pottery, Vessels 63-67.

Table 47
Feature 9 Rim Attributes

Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration
63	S/P	FM	Unknown		Unknown	Rim	Punctates (circular) – horiz row	n/a	
64	FM	FM	Straight		Rim strip	None		Flat	
65	S/P	S/P	Straight		Rim strip	Rim and lip	Linear CI – horiz rows	Flat	CI – obliques
66	FM		Straight		None	None		Flat	
67	FM		Straight		None	None		Flat	

Feature 10. The analysis of Feature 9 rims resulted in the identification of eight vessels (Figures 82 & 83). A summary of attributes recorded for rims from Feature 9 are listed in Table 48. Surface treatments were a mix of fabric marked, cord marked and smooth/plain techniques, but smooth treatments were most common. Two vessels showed differences between the surface treatment of the rim portion and neck. Six vessels had straight rim profiles and one was moderately everted. Five of the vessels had rim strips. Five vessels were decorated. The most common decorative elements were horizontal rows or linear cord impressions on the rim strip and oblique cord impressions on the lip. There were a variety of lip forms. Vessel 68 was the only vessel with lip notching, but the impressions were shallow. Castellations were present on Vessel 75. Rim diameters ranged between 22 and 38 cm. The vessel forms were uniform with jars.

Figure 82. Feature 10 pottery, Vessels 68-74.

Figure 83. Feature 10 pottery, Vessel 75.

Table 48
Feature 10 Rim Attributes

Vessel	Rim Surface	Neck Surface	Rim Profile	Camber	Rim Addition	Decoration	Rim Decoration	Lip Profile	Lip Decoration	Castellation
68	CM	CM	Mod everted		Rim strip	Lip		Notched	CI – shallow notching	
69	CM		Straight		Rim strip	None		n/a		
70	S/P	S/P	Straight		Rim strip	Rim	Linear CI – oblique rows	Flat		
71	FM		Straight		None	None		Pointed		
72	S/P		Straight		Unknown	Rim and lip	Linear CI – horiz rows	Bev ext	CI – obliques	
73	S/P	FM	Straight		Rim strip	Rim and lip	Linear CI – horiz rows	Round	CI – obliques	
74	S/P	FM	Unknown		Unknown	Rim	Linear CI – horiz rows	n/a		
75	FM	FM	Straight		Rim strip	None		Flat		Yes

4.3.6.3.3 Discussion

All of the pottery recovered from the features is considered a secondary deposit, since the pottery was contained in a midden deposit used to fill the features. While it is assumed that the midden is related to the features, whether all of the materials contained in the midden were contemporary with the use of the features was uncertain. Site 12-H-993 was multicomponent and occupation debris could have been mixed in the midden used to fill the features.

All of the rim sherds analyzed were grit tempered. There were a small number of shell tempered body sherds in the collection, but without rim forms they provide limited information. Surface treatments were variable, but overall cordmarking or fabric marking dominated the assemblage. As evidenced by the differences in rim and neck treatments, vessels may be predominately fabric or cordmarked over the body and have smoothed or plain necks and/or rims. All but one of the rims suggested that the vessel shapes were globular jars. Rim forms were dominated by rim strips. Decoration if it occurred was most often placed on either the rim or lip portion of the vessel. Only one rim had decoration on the neck.

The pottery collection was consistent with Late Woodland/Prehistoric assemblages found in central Indiana. The majority of the pottery appeared to represent one ceramic type or series defined as the Bowen ceramic series (Dorwin 1971). Two, possibly three, vessels were related to Albee Cordmarked or Albee Phase ceramics (McCord and Cochran 1993, Winters 1967). The pottery from 12-H-933 was related briefly to local and regional ceramics.

4.3.6.3.3.1 Bowen Ceramics

Local Relationships. The dominant ceramic assemblage from 12-H-993 is incorporated into ceramic types described from the Bowen site including: Bowen Cordmaked with Cord Impressed, Punched and Plain varieties; Bowen Sharply Everted Rim; Bowen Fabric Marked; and Bowen Collared with Cambered and Straight varieties (Dorwin 1971). These ceramics are typified at 12-H-993 as vessels with rim strips and the application of cord impressed motifs in linear bands along the strip or oblique cord impressions on the superior lip. The Bowen series ceramics (Great Lakes Impressed (cf. McCullough 2000)) along with pottery types including Oliver Cordmarked and Oliver Cordmarked and Incised (Helmen 1950) related to Anderson and Madisonville Fort Ancient are the defining diagnostic artifacts for the Oliver Phase (Dorwin 1971, McCullough 1991, McCullough 2000, McCullough et al. 2004).

Hundreds of Oliver Phase sites have been documented in the east and west forks of the White River drainage based on the direct association of the two ceramic traditions for surface and excavated situations (McCullough et al 2004:33). While the Oliver Phase seems to be defined based on the co-occurrence of the two ceramic traditions, there are a few excavated sites without the Fort Ancient ceramics: Moffitt Farm (12-H-6/46) and the nearby Castor Farm (12-H-3). The Bosson site (12-Ma-4) was initially reported to lack Fort Ancient styles (McCullough 1991:49) and several sherds from the site were used as examples of Bowen series pottery (Dorwin 1971). A few Fort Ancient-like sherds have since been reported for the site (McCullough 2000:311-316). While gathering data for the Woodland settlement model of this report, 10 sites were identified from the Upper White River drainage as having only Bowen series ceramics. The co-occurrence of the two ceramic styles may be influenced by geography. The Fort Ancient style pottery becomes less prevalent in ceramic assemblages at the northern end of the west fork of the White River and more prevalent in the south (White et al. 2002, McCullough et al. 2004). Of course, the southern sites are closer in proximity to the Fort Ancient Tradition of the Ohio Valley (McCullough et al. 2004:223). Assimilation processes are not considered to be part of the dynamic in the early or middle portions of the Oliver Phase, but are recognized as a possibility for the end of the Oliver Phase being absorbed into the Fort Ancient aggregation (McCullough et al. 2004:223). While this is a possibility, even when Fort Ancient and Bowen styles occur on the same vessel, the result is a Fort Ancient vessel shape often with guilloche designs with cord impression elements on a rim fold. Influences of Fort Ancient designs on Bowen series vessels are not readily apparent. If there is a "dominant" culture, it would appear Bowen had a larger influence on Fort Ancient.

In light of the growing evidence, both from excavated and surface collections, it would appear that the Bowen series ceramics are separate and independent of Fort Ancient styles in central Indiana. Radiocarbon dates from sites with only Bowen series ceramics date between approximately cal AD 1000 and 1400. From radiocarbon evidence and ceramic seriation, the Bowen series ceramics predate the Fort Ancient styles (McCullough et al. 2004), but were contemporary between AD 1200 and 1400. Several researchers have struggled with the problem of whether the Oliver Phase represents unrecognized multicomponent occupations indicated by the two ceramic traditions (Bush 2004b, Dorwin 1971, McCullough 1991). Several sites contain evidence that the Bowen series ceramics do occur in isolation, and cannot, therefore, be considered Oliver by its current usage of the co-occurrence of the two ceramic traditions.

Regional Relationships. Helmen (1950) related the ceramics that would be defined under the Bowen series to sites around Lake Erie in Michigan and Ohio. When Dorwin (1971:379) examined this relationship he stated that the vessel forms, size, paste, thickness and execution of decoration were entirely different and relationships were only of a remote kind. He suggested that the ceramics were more closely related to northwestern influences of Canton Ware and Madison Ware of Wisconsin and northern Illinois (Dorwin 1971:379). Canton Ware was defined by Fowler (1955) for ceramics in central Illinois with cord decorated parallel lines and cord filled triangles. More recent descriptions of Canton Ware styles include Maples Mills Cordmarked and Mossville Cordmarked (Esarey 2000:396). Faulkner (1961:96-99) also related cord impressed ceramics in Marshall County to Marion County sites and similar to Canton Ware or Maples Mills.

McCullough's (1991, 2000) work has returned to the belief that the Bowen series ceramics (Great Lakes Impressed) were more similar to northeastern styles, particularly Springwells ceramics, now defined as part of the Western Basin Tradition (eg. Stothers 1995). However, as McCullough and others (eg. McCullough et al. 2004:24-25) have already recognized, there are similarities in the motifs and methods of decoration between the Bowen series (Great Lakes Impressed styles) and Western Basin Tradition, but there are significant differences. The Bowen series does not typically have decoration on the neck or base of the rim, stamped or net-impressed designs, elongated necks or elongated vessel forms (McCullough et al. 2004:24-25).

In essence, the Bowen series ceramics are similar to other Great Lakes ceramics but are regionally distinctive. They may not necessarily be derived from one particular group or style. Cord decorated ceramics occur across the Great Lakes region. Although geographically removed from the Great Lakes, a Cordage Horizon (AD 650 to 800) has been recognized in the Upper Mississippi Basin (Benn and Green 2000:453). This Cordage Horizon (AD 950 to 1100) is followed by a collared tradition that is still decorated with corded designs (Benn and Green 2000:469). As Stothers (1992) has pointed out, oftentimes archaeological research is hindered by "fortuitous taxonomic constructs." Bush (2004b:129) has also recognized the problem of archaeological taxonomy in the Oliver Phase following historical priority. As she so aptly points out: "Had sites on the White River been excavated and their ceramics given type names before those on the Saginaw, Western Basin ware would seem to have a very different relationship to Oliver wares" (Bush 2004b: 129).

4.3.6.3.3.2 Albee Ceramics

Local Relationships. Two rim sherds, Vessels 41 and 42 in Feature 5, are recognized as related to the Albee Phase. In addition, Vessel 36 in Feature 3 is more Albee-like than Bowen-like. Albee Phase ceramics have been collected from numerous sites in central Indiana (McCullough 2000). Five habitation sites with Albee ceramics have been recorded in Hamilton and Delaware County. The Jarrett site (12-Dl-689) contained at least two Albee pit features with radiocarbon dates between cal AD 900 and 1250. Two cemeteries in the Upper White River drainage (east fork) have also been identified: Commissary (12-Hn-2) (Swartz 1982) and Hesher (12-Hn-298) (Cochran et al. 1988).

Regional Relationships. Winters (1967) related Albee Phase ceramics to northwestern types found in the Illinois River Valley and southern Wisconsin. More specifically, Albee Phase ceramics have been related most closely with Starved Rock Collared (Hall 1987) and Aztalan Collared (Baerris and Freeman 1958) (McCord and Cochran 1993:61-63, Winters 1967:88). Just as the Bowen series ceramics fit into a widespread ceramic tradition occurring in the Great Lakes region, so does Albee pottery (Douglas 1976, Halsey 1976).

Fitting (1968:23) recognized a widespread cordmarked collared horizon in the early Late Woodland period. In discussing Spring Creek Collared ceramics, he related them as similar to sherds at the Riviere au Vase site, Dillinger Cordmarked and Canton

Ware of Illinois, Albee Cordmarked of the Wabash Valley in Indiana and Illinois, Madison Cord Impressed near Chicago and Mahoning Cordmarked of Ohio (Fitting 1968:23-24). All of these types have both collared the uncollared variants, with the uncollared forms appearing earlier (Fitting 1968:24). Emerson and Titelbaum (2000:420) echo this collared ware horizon and place the distribution in eastern Iowa, northern Illinois, southwestern Michigan, southern Wisconsin and Indiana.

4.3.6.3.4 Summary

A recent overview of Late Woodland stated: "The Late Woodland was a world of shifting centers and peripheries, a cultural landscape marked by a series of continuous populations and uneven cultural development" (McElrath, Emerson and Fortie 2000:10). The occurrence of several contemporary ceramic styles in one geographic area is not unique. In the Poisson Phase (AD 800 -1100) of the Mississippi Valley, ceramics with cordwrapped stick impression on the interior of the lip occur with but decline as banded and geometric cord impressed ceramics appear in greater frequency (Gorman and Hassen 2000:289). Maples Mills Cord Impressed ceramics, a derivative of Canton Ware, have been reported at sites with collared ceramics similar to Albee Cordmarked (Esarey 2000:392). Madison Wares and collared ceramics have been documented together at sites in Wisconsin and in at least one case, the collared styles increased in frequency later in time (Birmingham and Eisenberg 2000:104). The occurrence of both Albee and Bowen ceramics at 12-H-993 may indicate a prior Albee presence at the site or a contemporary relationship where both ceramic populations utilized the area, but in different ways.

Further discussion of the Albee and Oliver Phase is explored in Section 5.0.

4.3.6.4 Modified Bone

By count, the largest quantity of material recovered during the excavation of 12-H-993 was bone/antler. Over 2600 pieces of bone and antler were recovered from the screened portions of the features excavated. A sample of the screened material and sample from the flotation were submitted for analyses to Dr. Tanya Peres. Additional modified bone is discussed in Section 4.3.6.5.6. This review applies to the 34 bone, antler or fragments that found in the screened samples and modified by cutting, shaping or polishing. A discussion of the artifacts is provided below.

4.3.6.4.1 Description

The bone assemblage for 12-H-993 appeared to be well preserved given the quantity of material recovered, but the majority was fragmented. During the sorting and analysis process, bone was examined for human modification other than burning. Thirty-four pieces or 1.3% of bone recovered displayed some form of modification.

Cut marks or narrow incisions were observed on 17 fragments of bone. Cut bone was noted in Feature 2 (n=2), Feature 3 (n=4), Feature 7 (n=10) and Feature 9 (n=1).

Two pieces of bone were noted to have polish. These were both recovered in Feature 3. Both pieces were also burned.

Five bone fragments were cut, shaped and had polish. These fragments may represent portions of awls or needles, but were too fragmentary to classify by tool type. One of the fragments was recovered in Feature 3 and four were recovered from Feature 7.

One bone fragment, part of a raccoon baculum, displayed two scored grooves that encircled the shaft (Figure 84e). The bone broke along one of these grooves. This piece was recovered in Feature 7. It is unclear if the grooves were executed to assist in breaking the bone or if they served another purpose.

The only recognizable bone tool was an awl (Figure 84g) manufactured from a turkey bone. The distal tip and portions of the proximal end were missing, so the awl was over 10 cm in length. It was recovered from Feature 7.

Four antler tines showed modification (Figure 84a - d). Each tine had been scored and appeared to have been snapped along the scored line. The antler tips were between 19 and 23 mm long. Three of the tines were found in Feature 7 and one was recovered from Feature 9.

One antler tine represents a nearly finished antler arrow point (Figure 84d). The antler had been cut, shaved and polished. The point was recovered in Feature 2. It was 34.0 mm long, 12.2 mm in diameter. The center was partially reamed to a depth of 8.6 mm.

Figure 84. Modified bone.

An antler drift was recovered from Feature 13 (Figure 84f). These cut, shaped and polished antler shafts are interpreted as pressure flakers (Cochran et al. 1988). The drift was 55.3 mm long, 12.9 mm wide and 7.4 mm thick. The distal end is differentially beveled and slightly offset.

4.3.6.4.2 Summary

Even though the bone preservation at site 12-H-993 was good, very few bone artifacts or bone tools were recovered. The bone tools are indicative of a general Late Woodland bone assemblage and are not unique to this site. Similar artifacts have been recovered from regional Albee and Oliver Phase sites (Cochran et al. 1988, Dorwin 1971, McCullough et al. 2004, Swartz 1982, White et al. 2002, 2003).

4.3.6.5 Zooarchaeological Analysis
by Alison M. Hadley and Dr. Tanya M. Peres

4.3.6.5.1 Introduction

This report discusses animal remains recovered as part of limited testing performed by The Archaeological Resources Management Service (ARMS) at Ball State University, at Site 12-H-993, located in Hamilton County, Indiana. The site represents the Albee and Oliver Phases of the Late Woodland and Late Prehistoric periods respectively. A large faunal assemblage was generated from the excavation of nine features, consisting of materials from the 6.4 mm mesh dry screen and the 2 mm and 0.4 mm mesh of the floatation (both heavy and light fractions).

A total of forty-three samples, twenty-one from the screened and twenty-two from the floated portion of the features was analyzed as part of this phase of the project. A variety of animal remains were recovered, primarily extant species that are native to the area under study (Table 49). These remains are undoubtedly affiliated with prehistoric deposits. They reflect the prehistoric animal taxa that were used by the inhabitants of site 12-H-993, primarily for subsistence.

Table 49
List of scientific and common names for identified taxa, Site 12-H-993.

Taxon	Common Name
Mammalia	mammals
Soricidae	shrews
Parascalops breweri	hairy-tailed mole
Carnivora	carnivores
Procyon lotor	raccoon
Cervidae	elk and deer
Cervus Canadensis	eastern elk
Odocoileus virginianus	white-tailed deer
Rodentia	rodents
Sciurus spp.	squirrels
Aves	birds
Meleagris gallopavo	turkey
Testudines	turtles
Terrapene carolina	eastern box turtle
Chelydra serpentina	snapping turtle
Amphibia	amphibians
Osteichthyes	bony fishes
Ictalurus punctatus	channel catfish
Notropis aterionoides	emerald shiner
Moxostoma erythrurum	golden redhorse

The majority of the zooarchaeological analysis was performed by Ms. Alison Hadley, under the direct supervision of Dr. Tanya M. Peres. Ms. Hadley also completed the data entry, data tables, and preparation of the technical and interpretative portions of the report.

4.3.6.5.2 Zooarchaeological Methods

The identification and analysis of the faunal remains were performed using the Zooarchaeological Comparative Collection housed at the University of Kentucky's William S. Webb Museum of Anthropology (WSWMA). Standard zooarchaeological procedures were used in this analysis following Reitz and Wing (1999). All specimens were identified to genus and species when possible. When this was not possible the most specific taxonomic classification possible was assigned. In some cases specimens were identified with "c.f." (from the Latin confere) before the taxonomic identification (Reitz and Wing 1999:37). In such cases the identification of a specimen is not completely secure, but the specimen compares with or is close to a particular species. In addition, it is not always possible to assign a specimen to a species, even if it is assigned to a genus. Thus, in these cases, "sp." is used for species, and "spp." is used if there is more than one species possible (Reitz and Wing 1999:37).

Identified elements were sided (i.e., left, right, axial) where appropriate. The taxonomy of mammals follows Wilson and Reeder (1993); bird taxonomy follows the Zooarchaeological Comparative Collection at the WSWMA; fish taxonomy follows Robins et al. (1991); and invertebrate taxonomy follows Turgeon et al. (1998). Any evidence of use-wear, thermal alteration, modification, or butchering was recorded. Weights and Number of Individual Specimens (NISP) were recorded for all specimens. All primary and secondary data were entered into a Microsoft® ACCESS database and are presented in Appendix G.

It is popular in zooarchaeology to study dietary contributions of animals identified in a given faunal assemblage. A number of methods for estimating dietary contributions have been developed, assessed, and modified over the years (e.g., Casteel 1974, 1978; Chaplin 1971; Grayson 1973, 1979; Lyman 1979; Parmalee 1965; Reitz and Wing 1999; Smith 1975; Stewart and Stahl 1977; White 1953; Wing and Brown 1979). However, the one method that provides information on the quantity of biomass from the materials recovered ("sample biomass") is used here. This method is preferred, as it is not based on assumptions of what parts of an animal were considered edible or inedible in the past; rather it is based on a biological relationship that holds true for all organisms over time (Retiz and Wing 1999:227). Thus, all invertebrate and vertebrate specimens identified in an assemblage can be included in dietary contribution estimates.

Sample biomass estimates were calculated for this assemblage using the archaeological specimen weights and the regression formula described below. Sample biomass refers to the estimated total weight represented by the archaeological specimen (Reitz and Wing 1999). Calculating the biomass of an animal requires data on the correlations between skeletal weight and total body weight (Casteel 1974;Reitz et al.

1987; Reitz and Wing 1999). These data are collected on modern specimens for application to biomass estimates. In many cases, biomass estimates were calculated using values at the family or class level.

For the assemblage, biomass was estimated using specimen weight in the following allometric formula (Reitz and Wing 1999:224):

$$Y = aXb$$
or
$$Y = \log10a + b\ (\log10X)$$

where:

Y = the estimated sample biomass (kg) contributed by the archaeological specimen
for a taxon
X = specimen weight of the archaeological specimens for a taxon
a = the Y=intercept of the linear regression line
b = slope of the regression line

Biomass for each taxon was calculated using values from Reitz and Wing (1999:72) and Wing (2001). General class and/or family values were used in cases where values for specific taxa were not available.

The Minimum Number of Individuals (MNI) was determined using the standard accepted procedure: the most abundant diagnostic element of each taxon was counted as the MNI (Grayson 1984; Reitz and Wing 1999). If this element was a paired element (left and right), then the higher count of the two was used. Size differences were also taken into account when appropriate. MNI was determined for each taxon within each context, and then recalculated by provenience (i.e., feature).

4.3.6.5.3 Potential Sources of Bias in the Sample

Researchers must identify possible sources of bias in any scientific study. This is also true for zooarchaeological studies. There are three types of biases common to archaeological samples: (1) those resulting from prehistoric socio-cultural beliefs and practices; (2) those introduced as a result of taphonomic history; and (3) biases inadvertently introduced by the excavator and zooarchaeologist. These biases can be viewed as a continuum along the life span of an archaeological assemblage, from selection and deposition of food items by the prehistoric consumers to recovery of archaeological remains by the modern-day archaeologist.

4.3.6.5.3.1 Socio-cultural biases

Prehistoric peoples would have selected certain animals from the environment to be incorporated into their diet. Their belief systems, including social status, food preferences and taboos, would have precluded the types of organisms included in (or excluded from) the diet (Cooke 1992; Gragson 1992). It is recognized that human groups choose to incorporate a relatively small part of the locally available foodstuffs into their diet; these choices may change on a daily, monthly, or annual basis. The mere absence of an animal from a faunal assemblage does not imply avoidance; likewise, presence of an animal does not imply consumption.

Specific food processing techniques such as butchering, roasting, salting, and drying, among others, together with waste disposal patterns, determined which foodstuffs actually made it into the future archaeological record. Areas specifically used for disposal (e.g., kitchen middens) may be located at an archaeological site, or food remains may be scattered about a habitation area. If the purpose of one's research is to understand the prehistoric environment, socio-cultural biases must be taken into account. The faunal remains deposited at a site are only part of the larger picture. Once disposed of, remains of animals are acted upon by a score of taphonomic processes, making the analyst's job more difficult.

4.3.6.5.3.2 Taphonomic processes

Faunal assemblages that are recovered for study do not include all of the materials that were originally deposited. The taphonomic history, i.e., the sum of all conditions acting upon the remains of a dead animal, determines the extent of preservation of that animal in the archaeological record. Zooarchaeologists look to taphonomic processes to understand what has aided or inhibited a particular assemblage's preservation, and to gain a perception of what may have been lost. Taphonomic processes that can affect bone and shell assemblages include: differential preservation, weathering, site inundation, erosional forces, redeposition, trampling, scavenging, human actions, soil pH, and plant intrusion (Davis 1987; Klein and Cruz-Uribe 1984; Lyman 1994; Reitz and Wing 1999).

Probably the single most important taphonomic process that operates on a faunal assemblage is differential preservation. In many archaeological sites, faunal remains are highly degraded or not recovered at all. Faunal remains can be well-preserved, poorly preserved, or only slightly altered depending on their specific osteological characteristics and the conditions of the surrounding environment. Osteological characteristics can include: chemical composition (bone vs. shell), relative maturity and size of the individual, diagnostic landmarks, bone density, and friability. Environmental conditions that affect preservation are soil acidity, climate, geographical location, and the matrix from which the remains were recovered.

The type of deposit and the geographical location of the deposit will determine which taphonomic processes will be most destructive. In central Indiana, taphonomic processes that must be considered include: soil pH, erosion, weathering, and disturbance/dispersal by non-human scavengers. Site 12-H-993 is located in a floodplain so it is probable that the site has been inundated since its prehistoric occupation. The specific cultural and natural factors at the site that may impact the preservation of faunal remains are not known.

Bones are best preserved when the soil has a pH of 7.8–7.9 (Reitz and Wing 1999). When pH values rise above eight (alkaline soils), bone mineral dissolves at an increased rate (Linse 1992). When soils become acidic, greater bone destruction takes place for every degree below neutral (Gordon and Buikstra 1981). Even with less than perfect soil conditions, animal remains decompose differentially. Elements that are not as calcified, such as those from subadults, are the least likely to survive, while adult teeth, due to the presence of enamel, are the most likely to survive.

4.3.6.5.3.3 Excavator bias

Appropriate measures must be taken by the archaeologist to limit the extent of excavator bias. The principal investigator, if different from the zooarchaeologist, should consult with the zooarchaeologist when devising and implementing the research design for an excavation. This will ensure that the optimum methods and techniques are used in the recovery of faunal remains. Often, this is not the case, and the specialist is sent a box of bones and asked to produce a species list. It is imperative for the zooarchaeologist to know what screen size the sample was recovered with; the origin of the sample (i.e., surface collection vs. feature); the field crew's ability to recognize faunal remains during excavation and screening; where the sample was separated (field vs. lab); and by whom the sample was separated (i.e., an individual or several people). This information is needed by the analyst to understand possible sources of bias, and to decide what types of information can be provided by the sample.

Faunal remains recovered from Site 12-H-993 include both vertebrates and invertebrates, and preservation of the remains was good. Several studies (Gordon 1993; Shaffer 1992; Wing and Quitmyer 1985) have shown that soils screened with larger mesh sizes (1/2-in. or 1/4-in.) are biased towards large animals (i.e., mammals), and give a skewed picture of the relative abundance and importance of one class of animals compared to another. The use of 6.4mm, 2mm, and 0.4 mm meshes allows for a more complete recovery of delicate animal remains. Thus, the faunal assemblage from Site 12-H-993 likely represents a sample of the range of animals deposited at the site.

4.3.6.5.4 The Archaeofaunal Assemblage

The total analyzed faunal assemblage from the Site 12-H-993 consists of 9,719 specimens weighing 1,444.02 g (Table 50; Appendix G). The vertebrate faunal remains consist of 9,539 specimens weighing 1,350.70 g. The invertebrate faunal remains consist of 180 specimens weighing 93.32 g. Within the vertebrate assemblage, twelve taxa are represented, including one genera and four species of mammals; one bird species; two species of reptiles; one class of amphibian; and three species of bony fish. In the invertebrate assemblage there are three taxa represented, bivalves are represented by three species, one genera, and one gastropod.

Table 50
Zooarchaeological Data for Site 12-H-993

Taxon	NISP	%	Weight	%	Biomass	%	Heat Alter.	%	Modified	%	Immature	%	MNI	%
Vertebrata	4679	48.14	79.18	5.48	3.30	7.32	1560	56.36	0	0	0	0.00	0	0.00
Vertebrata	**4679**	**48.14**	**79.18**	**5.48**	**3.30**	**7.32**	**1560**	**56.36**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**
Mammalia	3942	40.56	367.53	25.45	11.43	25.40	1159	41.87	11	45.83	2	20.00	0	0.00
Mammalia, large	152	1.56	272.16	18.85	8.96	19.91	15	0.54	8	33.33	6	60.00	0	0.00
Mammalia, medium	11	0.11	4.74	0.33	0.34	0.75	2	0.07	0	0.00	1	10.00	0	0.00
Mammalia, small-medium	1	0.01	0.11	0.01	0.02	0.04	0	0.00	0	0.00	0	0.00	0	0.00
Mammalia, small	23	0.24	1.95	0.14	0.16	0.36	4	0.14	0	0.00	0	0.00	0	0.00
Soricidae	2	0.02	0.02	0.00	0.00	0.01	0	0.00	0	0.00	0	0.00	0	0.00
c.f. *Parascalops breweri*	2	0.02	0.02	0.00	0.00	0.01	0	0.00	0	0.00	0	0.00	1	3.70
Carnivora	3	0.03	0.31	0.02	0.04	0.08	0	0.00	0	0.00	0	0.00	0	0.00
Procyon lotor	6	0.06	4.66	0.32	0.33	0.74	0	0.00	0	0.00	0	0.00	1	3.70
Cervidae	36	0.37	103.75	7.18	4.10	9.12	2	0.07	0	0.00	0	0.00	0	0.00
Cervus Canadensis	3	0.03	13.61	0.94	0.79	1.76	0	0.00	0	0.00	0	0.00	1	3.70
Odocoileus virginianus	108	1.11	425.48	29.46	12.86	28.59	6	0.22	4	16.67	1	10.00	3	11.11
Rodentia	9	0.09	0.06	0.00	0.01	0.02	3	0.11	0	0.00	0	0.00	0	0.00
c.f. *Sciurus*spp.	1	0.01	0.02	0.00	0.00	0.01	1	0.04	0	0.00	0	0.00	1	3.70
Sciurus spp.	24	0.25	1.97	0.14	0.17	0.37	6	0.22	0	0.00	0	0.00	2	7.41
Total Mammalia	**4323**	**44.48**	**1196.39**	**82.85**	**39.21**	**87.16**	**1198**	**43.28**	**23**	**95.83**	**10**	**100**	**9**	**33.33**
Aves	63	0.65	18.41	1.27	0.61	1.35	0	0.00	0	0.00	0	0.00	0	0.00
Aves, large	1	0.01	0.65	0.05	0.04	0.08	0	0.00	0	0.00	0	0.00	0	0.00
Aves, small	1	0.01	0.01	0.00	0.00	0.00	0	0.00	0	0.00	0	0.00	1	3.70
Meleagris gallopavo	9	0.09	41.68	2.89	1.20	2.68	0	0.00	1	4.17	0	0.00	1	3.70
Total Aves	**74**	**0.76**	**60.75**	**4.21**	**1.85**	**4.11**	**0**	**0.00**	**1**	**4.17**	**0**	**0.00**	**2**	**7.41**
Testudines	15	0.15	5.46	0.38	0.22	0.49	2	0.07	0	0.00	0	0.00	0	0.00
Terrapene carolina	1	0.01	1.18	0.08	0.06	0.13	0	0.00	0	0.00	0	0.00	1	3.70
Chelydra serpentina	2	0.02	4.63	0.32	0.19	0.42	0	0.00	0	0.00	0	0.00	1	3.70
Total Reptilia	**18**	**0.19**	**11.27**	**0.78**	**0.47**	**1.04**	**2**	**0.00**	**0**	**0.00**	**0**	**0.00**	**2**	**7.41**
Amphibia	1	0.01	0.01	0.00	0.00	0.00	0	0.00	0	0.00	0	0.00	1	3.70
Total Amphibia	**1**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**	**1**	**3.70**

Table 50 (cont.) Zooarchaeological Data for Site 12-H-993														
Taxon	NISP	%	Weight	%	Biomass	%	Heat Alter.	%	Modified	%	Immature	%	MNI	%
Osteichthyes	58	0.60	1.48	0.10	0.07	0.16	0	0.00	0	0.00	0	0.00	0	0.00
Osteichthyes, small	372	3.83	1.23	0.09	0.06	0.14	7	0.25	0	0.00	0	0.00	0	0.00
Ictaulurus punctatus	10	0.10	0.07	0.00	0.01	0.01	1	0.04	0	0.00	0	0.00	3	11.11
Notropis atherinoides	3	0.03	0.03	0.00	0.00	0.01	0	0.00	0	0.00	0	0.00	1	3.70
Moxostoma erythrurum	1	0.01	0.29	0.02	0.02	0.04	0	0.00	0	0.00	0	0.00	1	3.70
Osteichthyes	**444**	**4.57**	**3.10**	**0.21**	**0.16**	**0.36**	**8**	**0.29**	**0**	**0.00**	**0**	**0.00**	**5**	**18.52**
Total Vertebrata	**9539**	**98.15**	**1350.70**	**93.54**	**44.99**	**100**	**2768**	**100**	**24**	**100.0**	**10**	**100**	**19**	**70.37**
Invertebrata	39	0.40	0.78	0.05	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Gastropoda	1	0.01	0.01	0.00	0.00	0.00	0	0.00	0	0.00	0	0.00	1	3.70
Bivalvia	133	1.37	74.34	5.15	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00
cf. *Amblema plicata*	3	0.03	2.58	0.18	0.00	0.00	0	0.00	0	0.00	0	0.00	3	11.11
cf. *Elliptio dilatata*	1	0.01	11.44	0.79	0.00	0.00	0	0.00	0	0.00	0	0.00	1	3.70
cf. *Lampsilis* spp.	2	0.02	2.55	0.18	0.00	0.00	0	0.00	0	0.00	0	0.00	2	7.41
cf. *Plagiola lineolata*	1	0.01	1.62	0.11	0.00	0.00	0	0.00	0	0.00	0	0.00	1	3.70
Total Invertebrata	**180**	**1.85**	**93.32**	**6.46**	**0.00**	**0.00**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**	**8**	**29.63**
Total Assemblage	**9719**	**100**	**1444.02**	**100**	**44.99**	**100**	**2768**	**100**	**24**	**100**	**10**	**100**	**27**	**100**

The faunal remains at Site 12-H-993 were divided into three priorities groups by the ARMS project director (Appendix H, Table 23). Represented within the three priorities were the different levels for features 1,2,3,5,7,8,9, and 10, and a distinct catalog number was assigned for each. For example one of the samples of faunal remains represented in Priority one was Feature 1 Level 5 (catalog # 04.50.11.5), whereas Priority two contained faunal remains from Feature 1 Level 2 (catalog # 04.50.11.2). In each level of the features was a screened sample and a floatation sample. For each of the priorities there were samples from each separate feature level, except feature 8, which only contained a single sample from Level 1 (in Priority 1 catalog # 04.50.18.1). In Feature 5 Level 2 there was no bone in the screened sample but bone in the floatation sample. In the following discussion we first discuss the entire faunal assemblage and then address the individual features. Within the feature discussion we distinguish between the different levels but not between the screened and floatation samples from the same level.

4.3.6.5.4.1 Vertebrate Remains

Mammals. The majority of bone in this assemblage belongs to mammals (NISP=4,323; 1,196.39 g). The general category of Mammalia, which includes small, medium-small, medium, and large mammals, makes up 42.48% of the entire assemblage (NISP=4,129; 646.49 g). Specimens placed in this category were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification. Modified bone such as bone with heavy polish (n=10), specimens with heavy cut marks (n=9), and specimens that were cut (n=1) also fall into this category. Further discussion of the bone tools is included in the section "Modified Bone." Five species of mammal were identified in this assemblage, including: hairy-tailed mole (Parascalops breweri), raccoon (Procyon lotor), elk (Cervus canadensis), white-tailed deer (Odocoileus virginianus), and eastern gray squirrel (Sciurus carolinensis). Mammals with biomass estimates of less than 1.00 kg are not discussed below; these include the moles and shrews (0.01%, <0.01 kg), hairy-tailed mole (0.01%, <0.01 kg), raccoon (0.74%, 0.33 kg), elk (1.76%, 0.79 kg), squirrels (0.37%, 0.16 kg), and the gray squirrel (0.03%, 0.01 kg).

The white-tailed deer comprises the majority of the total assemblage (NISP=108, 425.48 g). The minimum number of individuals (MNI) represented is 3, based on the frequency of the right astragalus. The identified deer elements are both cranial (n=49, 71.41 g) and postcranial (n=59, 354.07 g). Of the 108 individual bone specimens, six were thermally altered, four were modified, and one was from an immature individual. White-tailed deer comprises 28.59% (12.86 kg) of the assemblage biomass (see Table 50).

Birds. The general category of Aves (n=65, 19.07 g), which includes small and large birds, was used when specimens were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification. There is a single species in this assemblage, the turkey (Meleagris gallopavo).

The turkey is represented by nine specimens, weighing 41.68 g. The identified elements are exclusively postcranial. The MNI for the turkey is one. Of the nine individual specimens, none were thermally altered. A single humerus exhibited over fourteen cut marks, an indication of disarticulation and/or defleshing of the skeleton prior to preparation and consumption. All of the specimens were from adult individuals. The turkey comprises 2.68% (1.20 kg) of the assemblage biomass (see Table 50).

Reptiles. A total of eighteen specimens, weighing 5.46 g, were identified as reptiles. The reptiles are exclusively represented by turtles: eastern box turtle (Terrapene carolina) and snapping turtle (Chelydra serpentina). The general category of turtles (Testudines) (n=15, 5.46 g) was used when specimens were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification.

The eastern box turtle is represented by one specimen, weighing 1.18 g. The identified element is a fused costal/marginal from the carapace. The MNI for the eastern box turtle is one. There was no evidence of thermal alteration, butchering/cut marks, and/or other modifications. The eastern box turtle comprises 0.13% (0.06 kg) of the assemblage biomass (see Table 50).

The snapping turtle is represented by two specimens, weighing 4.63 g. The identified elements are exclusively postcranial. The MNI for the snapping turtle is one. There was no evidence of thermal alteration, butchering/cut marks, and/or other modifications. The snapping turtle comprises 0.42% (0.19 kg) of the assemblage biomass (see Table 50).

Amphibians. The amphibians are represented in the entire assemblage by a single element, weighing 0.01 g. The identified element is the shaft of a humerus, and the MNI is one. There was no evidence of thermal alteration, butchering/cut marks, and/or other modification. Biomass estimates are not calculated for the amphibians as values for modern specimens are not available at this time.

Bony Fish. The bony fish in the assemblage total 444 specimens, weighing 3.10 g. The bony fish in this assemblage are represented by: channel catfish (Ictalurus punctatus), emerald shiner (Notropis atherinoides), and golden redhorse (Moxostoma erythrurum). The general category of bony fish (Osteichthyes) (n=430, 2.71 g), was used when specimens were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification. The emerald shiner represents a biomass of less than 0.01 kg (0.01%) and is not discussed in detail below.

The channel catfish is represented by 10 specimens, weighing 0.07 g. The identified elements are exclusively cranial. The MNI is three based on the frequency of the cleithrum. There was one specimen that was thermally altered. There was no evidence of butchering/cut marks, and/or other modification. The channel catfish comprises 0.01% (0.01 kg) of the assemblage biomass (see Table 50).

The golden redhorse is represented by one specimen, weighing 0.29 g. The identified element is an operculum. The MNI is one. There was no evidence of butchering/cut marks, and/or other modification. The golden redhorse comprises 0.04% (0.02 kg) of the assemblage biomass (see Table 50).

4.3.6.5.4.2 Invertebrate Remains

A total of 180 invertebrate specimens, weighing 93.32 g, were recovered from Site 12-H-993 (see Tables 49 and 50). The bivalves are represented by four species. A single gastropod was present at the site weighing 0.01g. The subphylum classification of invertebrates (Invertebrata) was used when specimens were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification. The invertebrates are represented by thirty-nine specimens, weighing 0.78 g. Biomass is not estimated for the invertebrates due to the lack of modern comparative analogs.

Bivalvia. A total of 140 specimens, weighing 92.53 g, were identified as bivalves (see Table 2). There are four species represented in this class, which includes species that closely resemble threeridge (Amblema plicata) (n=3, 2.58 g), spike (Elliptio dilatata) (n=1, 11.44 g) pocketbooks and muckets (Lampsilis sp.) (n=2, 2.55 g), butterfly (Plagiola lineolata) (n=1, 1.62g). The general category of bivalve (Bivalvia) (n=133, 74.34 g) was used when specimens were both too small and fragmented, or lacked diagnostic landmarks to secure a positive identification. None of the specimens represented modification, burning, or butchering. In general the preservation for the bivalves was poor.

Gastropoda. The gastropods are represented by a single specimen, weighing 0.01 g. Since this gastropod is likely a later intrusion to the site, biomass was not estimated.

4.3.6.5.5 Features Assemblage

A total of twelve cultural features were identified during limited testing at Site 12-H-993, nine of which were selected for excavation. The features were mapped in plan view and bisected. One half was excavated in 10 cm levels, and the soil was screened through 6.4 mm mesh. At this point a profile of the cross-section of the feature fill was drawn. The remaining half of the feature was excavated in 10 cm levels, and the soil was retained for flotation in the lab.

The features identified at Site 12-H-993 are associated with either Albee phase or Great Lakes ceramics. The fill excavated out of the features is believed to be secondary midden fill, and not necessarily related to the original function of the features (Beth McCord, personal communication 2005). Detailed descriptions of feature morphology and function can be found in Section 4. 3.6.1.

The faunal samples are associated with eight of the excavated features (Features 1-3, 5, 7-10) (see Appendix H, Table 23). The results of the zooarchaeological analysis of the faunal remains from each of these features will be discussed here.

Feature 1 Level 5. In Feature 1 Level 5, a total of 584 vertebrate and invertebrate specimens were recovered, weighing 217.97 g. The identifiable taxa in Feature 1 Level 5 are: raccoon, elk, deer, squirrel, and turkey (Appendix H, Table 1). Of these specimens ninety exhibit heat alteration, and two are modified; there are no immature individuals present. The total MNI for this level of the feature is eight.

The estimated biomass for all of the faunal remains in Feature 1 Level 5 is 9.72 kg. The biomass for all of the indeterminate mammals is 2.40 kg, or 24.77% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 2.85 kg, or 29.38% of the feature assemblage. The greatest biomass estimates, per species, in the midden, besides white-tailed deer, are respectively: deer/elk, elk, raccoon, turkey, and squirrel (see Appendix H, Table 1).

Feature 1 Level 2. In Feature 1 Level 2, a total of 560 vertebrate specimens were recovered, weighing 23.30 g. The identifiable taxa in Feature 1 Level 2, are: raccoon, deer, squirrel, and catfish (Appendix H, Table 2). Of these specimens ninety-five exhibit heat alteration; there are no modified for immature individuals represented. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 1 Level 2, is 1.34 kg. The biomass for all of the indeterminate mammals is 1.13 kg, or 84.22% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 0.15 kg, or 11.49% of the feature assemblage. The second greatest biomass estimate in the midden is for the raccoon (see Appendix H, Table 2).

Feature 1 Level 7. In Feature 1 Level 7, a total of 621 vertebrate and invertebrate specimens were recovered, weighing 157.80 g. The identifiable taxa in Feature 1 Level 7 are: elk, deer, squirrel, catfish, and threeridge mussel (Appendix H, Table 3). Of these specimens 162 exhibit heat alteration, five are modified, and two are immature. The total MNI for this level of the feature is eleven.

The estimated biomass for all of the faunal remains in Feature 1 Level 7, is 6.52 kg. The biomass for all of the indeterminate mammals is 4.33 kg, or 66.44% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 1.52 kg, or 23.28% of the feature assemblage. Elk and squirrel have the second and third greatest estimates for biomass, respectively (see Appendix H, Table 3).

Feature 2 Level 5. In Feature 2 Level 5, a total of 622 vertebrate and invertebrate specimens were recovered, weighing 120.79 g. The identifiable taxa in Feature 2 Level 5, are: white-tailed deer, squirrel, and spike mussel shell (Appendix H, Table 4). Of these specimens eighty exhibit heat alteration, and one is modified; there are no immature individuals represented in this level. The total MNI for this level is seven.

The estimated biomass for all of the faunal remains in Feature 2 Level 5, is 4.99 kg. The biomass for all of the indeterminate mammals is 1.40 kg, or 28.13% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 3.20 kg, or 64.19% of the feature assemblage. The indeterminate small fish have the next highest biomass estimates (see Appendix H, Table 4).

Feature 2 Level 2. In Feature 2 Level 2, a total of 1,140 vertebrate and invertebrate specimens were recovered, weighing 130.15 g. The identifiable taxa in Feature 2 Level 2, are: hairy-tailed mole, white-tailed deer, squirrel, and catfish (Appendix H, Table 5). Of these feature specimens 152 exhibit heat alteration and one is immature; none are otherwise modified. The total MNI for this level of the feature is nine.

The estimated biomass for all of the faunal remains in Feature 2 Level 2, is 6.05 kg. The biomass for all of the indeterminate mammals is 21.03 kg, or 50.11% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 2.88 kg, or 47.61% of the feature assemblage. The largest biomass estimates in the midden, besides the deer, is the squirrel (see Appendix H, Table 5).

Feature 2 Level 8. In Feature 2 Level 8, a total of 249 vertebrate and invertebrate specimens were recovered, weighing 29.01 g. The identifiable taxa in Feature 2 Level 8, are: deer and rodents (Appendix H, Table 6). Of these feature specimens thiety-five exhibit heat alteration; none were modified, and none are immature. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 2 Level 8 is 1.64 kg. The biomass for all of the indeterminate mammals is 0.47 kg, or 28.44% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 1.15 kg, or 70.44% of the feature assemblage.

Feature 3 Level 5. In Feature 3 Level 5, a total of 349 vertebrate and invertebrate specimens were recovered, weighing 52.21 g. The identifiable taxa in Feature 3 Level 5, are: deer, squirrel, turkey, and emerald shiner (Appendix H, Table 7). Of these specimens thirty-five exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is five.

The estimated biomass for all of the faunal remains in Feature 3 Level 5, is 2.64 kg. The biomass for all of the indeterminate mammals is 1.76 kg, or 66.74% of the feature assemblage. The identifiable specimen with the greatest biomass was the turkey with 0.54 kg, or 20.44% of the feature assemblage. The species with the second largest biomass estimate is the deer (see Appendix H, Table 7).

Feature 3 Level 2. In Feature 3 Level 2, a total of 199 vertebrate specimens were recovered, weighing 20.21 g. The identifiable taxa in Feature 3 Level 2, are: deer, squirrel, and catfish (Appendix H, Table 8). Of these feature specimens thirty-three exhibit heat alteration; there is no evidence of modification, and no immature individuals are represented. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 3 Level 2, is 1.35 kg. The biomass for all of the indeterminate mammals is 0.99 kg, or 73.18% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 0.10 kg, or 7.26% of the feature assemblage. The squirrel has the second largest biomass estimate (see Appendix H, Table 8).

Feature 3 Level 7. In Feature 3 Level 7, a total of 332 vertebrate and invertebrate specimens were recovered, weighing 53.78 g. The identifiable taxa in Feature 3 Level 7, are: deer, catfish, and pocketbook/mucket mussel (Appendix H, Table 9). Of these feature specimens fourty-one exhibit heat alteration; there are no immature individuals represented, and there are no other signs of modifications. The total MNI for this level of the feature is five.

The estimated biomass for all of the faunal remains in Feature 3 Level 7, is 2.70 kg. The biomass for all of the indeterminate mammals is 1.53 kg, or 56.43% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 1.07 kg, or 39.46% of the feature assemblage (see Appendix H, Table 9).

Feature 5 Level 4. In Feature 5 Level 4, a total of 302 vertebrate specimens were recovered, weighing 4.87 g. The identifiable taxon in Feature 5 Level 4, is squirrel (Appendix H, Table 10). Of these feature specimens 269 exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is one.

The estimated biomass for all of the faunal remains in Feature 5 Level 4, is 0.39 kg. The biomass for all of the indeterminate mammals is 0.09 kg, or 23.67% of the feature assemblage. The identifiable specimen with the greatest biomass was the squirrel with 0.01 kg, or 1.44% of the feature assemblage (see Appendix H, Table 10).

Feature 5 Level 2. In Feature 5 Level 2, a total of 356 vertebrate specimens were recovered, weighing 19.60 g. The identifiable taxa in Feature 5 Level 2, are: deer and eastern box turtle (Appendix H, Table 11). Of these feature specimens 288 exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is three.

The estimated biomass for all of the faunal remains in Feature 5 Level 2, is 1.23 kg. The biomass for all of the indeterminate mammals is 1.15 kg, or 93.52% of the feature assemblage. The identifiable specimen with the greatest biomass was the box turtle with 0.06 kg, or 4.90% of the feature assemblage. The deer has the second largest biomass estimate (see Appendix H, Table 11).

Feature 5 Level 5. In Feature 5 Level 5, a total of 222 vertebrate specimens were recovered, weighing 14.25 g. The identifiable taxa in Feature 5 Level 5, are: deer and squirrel (Appendix H, Table 12). Of these feature specimens 191 exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is three.

The estimated biomass for all of the faunal remains in Feature 5 Level 5, is 0.95 kg. The biomass for all of the indeterminate mammals is 0.93 kg, or 97.83% of the feature assemblage. The identifiable specimen with the greatest biomass was the squirrel with 0.02 kg, or 1.81% of the feature assemblage (see Appendix H, Table 12).

Feature 7 Level 6. In Feature 7 Level 6, a total of 1,126 vertebrate and invertebrate specimens were recovered, weighing 194.28 g. The identifiable taxa in Feature 7 Level 6, are: moles/shrews, elk, deer, turkey, snapping turtle, and golden redhorse (Appendix H, Table 13). Of these feature specimens 270 exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is eight.

The estimated biomass for all of the faunal remains in Feature 7 Level 6, is 8.48 kg. The biomass for all of the indeterminate mammals is 2.36 kg, or 27.81% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 2.23 kg, or 26.35% of the feature assemblage. The largest biomass estimates in this level of the feature, besides the deer, are respectively the: turkey, snapping turtle, and golden redhorse (see Appendix H, Table 13).

Feature 7 Level 2. In Feature 7 Level 2, a total of 769 vertebrate specimens were recovered, weighing 71.45 g. The identifiable taxa in Feature 7 Level 2, are: raccoon, deer, and turkey (Appendix H, Table 14). Of these feature specimens 162 exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 7 Level 2, is 4.08 kg. The biomass for all of the indeterminate mammals is 2.04 kg, or 50.18% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 1.17 kg, or 28.60% of the feature assemblage. The raccoon and turkey have the second and third largest biomass estimates in this feature and level, respectively (see Appendix H, Table 14).

Feature 7 Level 8. In Feature 7 Level 8, a total of 624 vertebrate and invertebrate specimens were recovered, weighing 246.69 g. The identifiable taxa in Feature 7 Level 8, are: hairy-tailed mole, deer, squirrel, turkey, emerald shiner, pocketbook/mucket mussel and butterfly mussel shell (Appendix H, Table 15). Of these feature specimens 154 exhibit heat alteration, eight are modified, and seven are immature. The total MNI for this level of the feature is eight.

The estimated biomass for all of the faunal remains in Feature 7 Level 8, is 9.52 kg. The biomass for all of the indeterminate mammals is 6.51 kg, or 68.37% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 2.42 kg, or 25.40% of the feature assemblage. The squirrel and turkey have the second and third largest biomass estimates in this feature and level, respectively (see Appendix H, Table 15).

Feature 8 Level 1. In Feature 8 Level 1, a total of 116 vertebrate specimens were recovered, weighing 22.56 g. The identifiable taxon in Feature 8 Level 1, is the deer (Appendix H, Table 16). Of these feature specimens ninety-nine exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is two.

The estimated biomass for all of the faunal remains in Feature 8 Level 1, is 1.47 kg. The biomass for all of the indeterminate mammals is 0.32 kg, or 36.64% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 0.59 kg, or 40.35% of the feature assemblage (see Appendix H, Table 16).

Feature 9 Level 5. In Feature 9 Level 5, a total of 256 vertebrate specimens were recovered, weighing 6.44 g. There are no taxa that are diagnostic enough to be identifiable to genus or species in Feature 9 Level 5 (Appendix H, Table 17). Of these feature specimens 106 exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is three.

The estimated biomass for all of the faunal remains in Feature 9 Level 5, is 0.53 kg. The biomass for all of the indeterminate mammals is 0.29 kg, or 53.80% of the feature assemblage.

Feature 9 Level 3. In Feature 9 Level 3, a total of 211 vertebrate specimens were recovered, weighing 5.46 g. The identifiable taxon in Feature 9 Level 3, is the deer (Appendix H, Table 19). Of these feature specimens 101 exhibit heat alteration; there are no other modifications, and no immature individuals are represented. The total MNI for this level of the feature is three.

The estimated biomass for all of the faunal remains in Feature 9 Level 3, is 0.43 kg. The biomass for all of the indeterminate mammals is 0.42 kg, or 97.49% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 0.01 kg, or 2.26% of the feature assemblage (see Appendix H, Table 19).

Feature 9 Level 4. In Feature 9 Level 4, a total of 548 vertebrate specimens were recovered, weighing 22.06 g. The identifiable taxon in Feature 9 Level 4, are deer and catfish (Appendix H, Table 19). Of these feature specimens 188 exhibit heat alteration and two are modified; there are no immature individuals represented. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 9 Level 4, is 1.51 kg. The biomass for all of the indeterminate mammals is 0.78 kg, or 51.44% of the feature assemblage. The identifiable specimen with the greatest biomass was the white-tailed deer with 0.28 kg, or 18.28% of the feature assemblage.

Feature 10 Level 5. In Feature 10 Level 5, a total of 165 vertebrate specimens were recovered, weighing 8.01 g. The identifiable taxon in Feature 10 Level 5, is the emerald shiner (Appendix H, Table 20). Of these feature specimens forty-eight exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is five.

The estimated biomass for all of the faunal remains in Feature 10 Level 5, is 0.64 kg. The biomass for all of the indeterminate mammals is 0.4 kg, or 61.87% of the feature assemblage. The identifiable specimen with the greatest biomass was the emerald shiner with less than 0.01 kg, or 0.17% of the feature assemblage.

Feature 10 Level 3. In Feature 10 Level 3, a total of 183 vertebrate specimens were recovered, weighing 13.39 g. The identifiable taxon in Feature 10 Level 3, is the white-tailed deer (Appendix H, Table 21). Of these feature specimens eighty-nine exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is four.

The estimated biomass for all of the faunal remains in Feature 10 Level 3, is 1.03 kg. The biomass for all of the indeterminate mammals is 0.64 kg, or 75.47% of the feature assemblage. The identifiable specimen with the greatest biomass was the deer with 0.18 kg, or 17.35% of the feature assemblage (see Appendix H, Table 21).

Feature 10 Level 4. In Feature 10 Level 4, a total of 185 vertebrate specimens were recovered, weighing 10.46 g. The identifiable taxon in Feature 10 Level 4 is the squirrel (Appendix H, Table 22). Of these feature specimens eighty exhibit heat alteration and one is modified; there are no immature individuals represented. The total MNI for this level of the feature is three.

The estimated biomass for all of the faunal remains in Feature 10 Level 4, is 0.79 kg. The biomass for all of the indeterminate mammals is 0.53 kg, or 67.93% of the feature assemblage. The identifiable specimen with the greatest biomass was the squirrel with less than 0.01 kg, or 10.46% of the feature assemblage (see Appendix H, Table 22).

4.3.6.5.6 Modified Bone

There were twenty-four bone specimens that were modified. One of these specimens was a white-tailed deer antler weighing 3.72g. This antler fragment is identified as a tool because of its highly polished surface. A single mammalian baculum weighing 0.54 g exhibited polishing on the distal end. The majority of the modified bones either demonstrated polishing and/or butcher/cut marks, none of these were identifiable tools. A total of five specimens exhibited heavy cut or butcher marks. A single specimen contained a reddish tint that may be associated with red ochre. Eleven specimens were identified as exhibiting polish.

4.3.6.5.7 Species Biomass and Habitat Preference

Site 12-H-993 is located on a floodplain of the West Fork of the White River (McCord 2005). A discussion of the most significant taxa, according to biomass estimates, and the habitats of the taxa, will aid in developing a deeper understanding of the environment in which the prehistoric people of Site 12-H-993 inhabited and exploited (see Table 50). Biomass estimates were not calculated for the amphibians or invertebrates, as comparative data from modern reference specimens are not available. Thus, habitat information for each of the identified invertebrate species will be presented.

The greatest biomass for a taxon in the identifiable assemblage was the white-tailed deer, with 12.86 kg, or 28.59% of the biomass of the entire assemblage. The white-tailed deer are common throughout the United States, especially in the southeastern region. They tend to be most abundant in habitats on the edges of forests (Brown 1997:182). Their diet consists of fruits, berries, mushrooms, twigs, leaves, grasses, and tender shoots of trees and shrubs (Brown 1997:182).

The second highest biomass estimate at Site 12-H-993 is the turkey with 1.20 kg, or 2.68% of the entire assemblage. The turkey is commonly found throughout the Southeastern United States. Their preferred habitats are pine-oak forests and oak woodlands (Bull and Farrand 1994:450-451).

The third highest estimated biomass for a taxon at Site 12-H-993 is the elk with 0.79 kg, or 1.76 % of the assemblage. This particular species of elk is the largest in North America, and was exterminated from the Southeastern Untied States by 1850 due to heavy exploitation by early settlers (Brown 1997:214). Their habitat is not clear but probably consisted of a mix of hardwood and open meadows, with a diet of twigs, shrubs, and grasses (Brown 1997:214).

The estimated biomass for the raccoon is 0.33 kg, or 0.74% of the complete assemblage. The raccoon is found throughout the Southeastern United States, inhabiting various types of forested regions, especially in floodplains (Brown 1997:150). Their diet consists of many plants and animals, or whatever is available, including refuse discarded by humans (Brown 1997:151).

The estimated biomass for the snapping turtle is the fourth greatest at the site, with 0.19 kg, or 0.42%. This species occurs throughout the eastern two-thirds of the United States. The typical habitat for the snapping turtle is in and around bodies of freshwater, especially those with soft mud bottoms and abundant vegetation. The snapper feeds on invertebrates, carrion, aquatic plants, fish, birds, and small mammals. Although snapping turtles can inflict a serious bite when lifted or teased, their meat is considered by some to be a delicacy (Behler and King 1979:435-436).

The estimated biomass for the squirrel is 0.17 kg or 0.37% of the entire assemblage. There are two species of squirrel known for this region, the eastern gray (Sciurus carolinensis) and the fox (Sciurus niger). The distinction is not made between the two species known for this region, as osteologically they are very similar, and the elements were not complete enough. The fox squirrel is larger than its gray counterpart (eastern gray squirrel); the two rarely occur together in great numbers and they do not interbreed. The fox squirrel inhabits open forests (hardwoods, pine flatwoods, pine-oak, and oak-hickory woodlands) (Brown 1997:101). Fox squirrels spend more of their time foraging on the ground compared to the eastern gray squirrel. They feed on many of the same items as the eastern gray squirrel in addition to tubers, buds, and bulbs (Brown 1997:101). The fox squirrel is also diurnal and active the entire year, but prefers to forage slightly later in the day than the gray squirrel. These two squirrels’ range includes the eastern half of North America. Both squirrels have a beneficial affect on the environment because their storing of seeds and nuts for food results in the germination of a number of tree species (i.e., oaks, hickories, pecans, walnuts, pines, and beech) (Brown 1997:100-101). Squirrels are ubiquitous in both prehistoric and historic archaeological faunal assemblages from across the southeastern United States.

The estimated biomass for the eastern box turtle is 0.06 kg, or 0.13% of the assemblage. The box turtle is found throughout the eastern United States mainly in habitats of moist forested areas, wet meadows, pastures, and floodplains (Behler and King 1979:468). Their diet consists of slugs, earthworms, strawberries, and poisonous mushrooms (Behler and King 1979:469).

The estimated biomass of the golden redhorse is 0.02 kg or 0.04% of the estimated biomass for the entire assemblage. This fish prefers clear rivers and medium-sized streams with gravelly riffles and permanent pools (Iowa Department of Natural Resources 2005). The golden redhorse feed on insects and small invertebrates.

The estimated biomass of the emerald shiner is 0.03 kg, or 0.01% of the estimated biomass for the entire assemblage. Today the emerald shiner is a fish of large bodies of water, the Great Lakes and larger rivers, such as the Niagara and the Hudson. It is a midwater or near-surface species that usually lives in large- or moderate-sized schools. In the spring, they often make vertical migrations, approaching the surface at night and retreating to deeper water during the day. Population numbers fluctuate and they are extremely abundant in some years, scarce in others. The emerald shiner is a midwater plankton feeder, consuming a variety of zooplankton. Protozoans are important in the diet of the young-of-the-year shiners, and fish and insect larvae are eaten by adults (Cornell Department of Natural Resources 2005).

The estimated biomass of the channel catfish is 0.07 kg or 0.01% of the estimated biomass of the entire assemblage. Channel catfish are most abundant in large streams with low or moderate current. They spawn in late spring or early summer when water temperatures reach 75°F. Males select nest sites which are normally dark secluded areas such as cavities in drift piles, logs, undercut banks, rocks, cans, etc. Channel catfish less than 4 inches in length feed primarily on small insects. Adults are largely omnivorous, feeding on insects, mollusks, crustaceans, fish, and even some plant material. Sexual maturity is reached in two or three years in captivity, whereas data from natural populations indicates channel catfish in Texas reach sexual maturity in 3-6 years. Most are mature by the time they reach 12 inches in length (Texas Parks and Wildlife 2005).

The four molluscan species identified in the Eva Bandman assemblage are: threeridge (Amblema plicata), Lampsilis spp., the spike (Elliptio dilatata), and the butterfly (Plagiola lineolata). It should be noted that all of these invertebrate specimens were identified with a cf. in front of the taxonomic name. This is because the identifications are not equivocal, and they most closely compare to these individuals in the modern comparative collection.

The threeridge (MNI=3) is found from Texas, Louisiana, and Mississippi north to Canada (Parmalee and Bogan 1998:61). This mussel is found in a variety of habitats, including lakes, rivers, and streams (still to very swift-moving); in Kentucky it is found in small streams to large rivers (Cicerello and Schuster 2003:8; Parmalee and Bogan 1998). While the threeridge can be found on a variety of substrates, it occurs most commonly on sand and gravel in one to three feet of water (Parmalee and Bogan 1998:63).

The Lampsilis spp. (MNI=2) specimens could not be identified to one of the five species that occur in Indiana (L. cardium, L. fasciola, L. ovata., L. siliquoidea, L. teres). All of these mussels prefer substrates of sand, gravel, and mud mix. However, they differ in their preference for water flow (i.e., fast-moving, riffles, slow-moving) (Parmalee and Bogan 1998:127-138).

The spike (MNI=1) can exist in a variety of aquatic habitats, however they seem to prefer a firm substrate of coarse sand and gravel with moderate to strong current (Parmalee and Bogan 1998:80-81). The spike is found in modern times in the entire of the Mississippi River drainage, from the St. Lawrence River and its tributaries, south to northern Louisiana, and west to the tributaries of the Red River in Oklahoma (Parmalee and Bogan 1998:79).

The butterfly (MNI=1) is found over a wide range that includes the Mississippi River drainage from western Pennsylvania west to Minnesota, south to eastern Iowa, Kansas, Arkansas, Oklahoma, and the Gulf states (Parmalee and Bogan 1998:73-74). The butterfly prefers stretches of river with a moderately strong current and a substrate of coarse sand and gravel (Parmalee and Bogan 1998:74).

As can be seen in Table 49, a limited number of taxa were exploited at Site 12-H-993. The animals represented in this assemblage occurred locally in the West Fork of the White River area during the Late Woodland and Late Prehistoric periods. However, a single vertebrate taxa comprises the majority of the diet. The white-tailed deer constitutes the majority (28.59%) of the biomass estimates for the entire assemblage. Turkey is the second highest (2.68%), followed by elk (1.76%), raccoon (0.74%), snapping turtle (0.42%), squirrel (0.37%), eastern box turtle (0.13%), golden redhorse (0.04%), and the emerald shiner and channel catfish that comprise 1% each of the biomass estimates (see Table 50).

4.3.6.5.8 Seasonality

Deer can be excellent indicators of seasonality due to their restricted living range and predictable mating patterns. The presence of antlers and unfused juvenile elements aids in the determination of seasonality. Unfortunately, in the Site 12-H-993 assemblage there is only a single element of each of these, which is not enough information to determine the overall pattern of seasonal collection. While there are individual teeth, the WSWMA comparative collection is not sufficient enough to allow age estimations on these elements. The remainder of the Site12-H-993 mammals lack detailed information that would indicate procurement within a particular season. However, it is interesting that a single carnivore baculum was recovered, which is evidence for a male individual.

The two reptile species in the assemblage, snapping turtle and eastern box turtle, live in different habitats. The snapping turtles are usually aquatic while box turtles are usually terrestrial. Both species hibernate during the winter, and it has been suggested this was the easiest time to collect them (McCullough and Wright 1997:293). However, the small number of specimens in the assemblage is not significant enough to extrapolate a major season of procurement.

The three fish species in the assemblage, channel catfish, emerald shiner, and golden redhorse, all spawn in the spring and summer. These species prefer similar habitats, large streams, lakes, and pools, although each stay within a certain area of the stream. Interestingly enough, all three of these particular species of fish are known hosts for the glochidia of the threeridge, one of the known mussel species in the assemblage (Parmalee and Bogan: 1998:63). This suggests that procurement of aquatic species, both vertebrate and invertebrate, was likely from the same locale. The four species of mussels in the assemblage are wide-ranging and could have been procured during a variety of seasons.

4.3.6.5.9 Summary of Site 12-H-993 Faunal Assemblage

Due to the highly fragmented nature of the faunal remains at site 12-H-993 the overwhelming majority of faunal specimens were indeterminate vertebrate and mammal fragments. The majority of the identifiable faunal assemblage is comprised of white-tailed deer. Another large mammal represented is elk, comprising a much smaller percentage of the faunal assemblage. A large amount of aquatic taxa were identified in the assemblage, mostly as indeterminate small bony fish and many mussel shell fragments. Turkey was comprised a very small amount if this assemblage. Thus, the occupants of the Site 12-H-993 likely subsisted heavily on white-tailed deer and small bony fish. This underlying subsistence structure was supplemented with the other taxa identified in the sample. The species diversity and equitability numbers also support this argument. Animals that are represented in the sample in any quantity to speak of (deer, raccoon, squirrel, turkey, catfish, and mussels) are all locally available and thrive in the region. None of the animals represented in the assemblage can be considered “exotic” or non-local to the area. Evidence of butchering suggests that post-cranial deer skeletons were disarticulated and defleshed prior to consumption. Cut marks were also observed on indeterminate mammal bones and the humerus shaft of a turkey.

4.3.6.5.10 Modeling Albee and Oliver Phase Subsistence Strategies in Central Indiana

Site 12-H-993 is located in an area that was inhabited by both Albee and Oliver Phase peoples. The material culture assemblage from this site is overwhelmingly Oliver associated in nature, however, one feature (Feature 5) contained Albee Phase ceramics. The comparison of sites that are distinctly Albee with those that are distinctly Oliver shows that, at this time, the faunal assemblages do not appear to have characteristics specific to either one of the cultural groups.

The faunal assemblage from Site 12-H-993 is important because it allows us to draw conclusions about Late Prehistoric subsistence in Central Indiana at the site level. However, it is also important to place the Site 12-H-993 faunal assemblage into the larger picture by comparing the analyzed faunal assemblage with others from the region. The data from Site 12-H-993 will be examined in light of the date from these to cultural phases to assess which cultural group model they more closely resemble.

A total of seven sites that yielded faunal remains have been chosen for comparison. Of these, one contains Albee Phase cultural components, and was chosen for comparative analysis. This is due to the lack of data from purely habitation sites (i.e., sites without formal cemeteries), and the overall paucity of zooarchaeological data from Albee Phase sites. The remaining six sites contain Oliver Phase cultural components.

4.3.6.5.10.1 Albee Phase Faunal Remains

The Morell-Sheets Site (12My87) is located in the Middle Wabash drainage basin in a “gently undulating” landscape (McCord and Cochran 1994:3). The site is a single component habitation dating to the Albee Phase of the Late Woodland (800-1200 A.D.) (McCord and Cochran 1994). Excavations revealed a large midden and several fire-cracked rock filled pits. This midden comprises a majority of the identified features at the site. The Morell-Sheets Site also contained a dog burial (McCord and Cochran 1994; Richards 1994).

The excavations at the Morell-Sheets Site yielded 3,891 vertebrate, 4,868 terrestrial and aquatic gastropods, and 1,100 bivalves from dry screened and flotation samples (Richards 1994:104-106, 112). Soils recovered from test units and features were screened through 6.4 mm mesh, and flotation samples were taken from both features and units form the southwestern corner.

A total of twenty-five vertebrate species are represented in the faunal remains. The entire vertebrate faunal assemblage is comprised of mammal (90.4%), bird (0.2%), reptile (4.1%), amphibian (<0.1%), fish (3.2%), and indeterminate vertebrates (2%). Of the identifiable assemblage (n=130), white-tailed deer accounts for 3.69% of the mammals (Richards 1994). Other mammals identified in this assemblage include short-tailed shrew, least shrew, vole, mole, muskrat, beaver, porcupine, woodchuck, elk, raccoon, domestic dog, squirrel, and eastern cottontail rabbit. Turkey is the only bird identified in this assemblage. Reptiles are represented by box, painted, map, and softshell turtles. The assemblage contains a single amphibian bone. Fish are represented by sunfish/bass, catfish, and minnows.

A total of 4868 terrestrial and aquatic gastropods were also recovered from this site. Of these 27 species were identified. The gastropods at the site were from natural accumulation (Richards 1994:106-108, Table 15). Additionally, a total of 1,100 mussel shell fragments were recovered in this assemblage, but were not identified further.

Modified bone at the site included bone needles, a polished bone tool fragment, and turtle shell modifications. There were a total of three bone needles reported at the site. The needles were shaped from rib bones making them very long and thin with a hole at one end (McCord and Cochran 1994:69). McCord and Cochran (1994:69) reports that similar types of bone pins have been reported at other Albee Phase sites in Indiana and ethnographic examples of similar needles were used to sew cattail mats in the Great Lakes region. Additionally, the interior surface of turtle costal fragments exhibited scraping and grinding (Richards 1994:104).

The authors conclude that deer and turtle were the most important food animals in the assemblage. The modified turtle shell also suggests that turtle were important in making vessels or rattles (McCord and Cochran 1994). There was a large presence of dog at the site but there was no evidence that they were butchered and used as food. Fish, waterfowl, and elk played minor roles in the subsistence at the Morell-Sheets Site.

4.3.6.5.10.2 Oliver Phase Faunal Remains

A total of six sites are assigned to the Oliver Phase (A.D. 1200-1400) and are reviewed here for comparative purposes. These sites include the Bundy-Voyles (Garniewicz 1998; McCullough and Wright 1997); Sugar Creek (McCullough and Wright 1997); Clampitt (Garniewicz 1998); Bowen (Dorwin 1971; Garniewicz 1998); Cox's Woods (Redmond and McCullough 1996); Strawtown (Garniewicz 2001).

Bundy-Voyles Site (12Mg1). The Bundy-Voyles Site (12Mg1) is located on an upper floodplain of the White River. The midden parallels an oxbow lake and dates to A.D. 1285-1435 (Garniewicz 1998). The excavations at the Bundy-Voyles Site yielded 33,000 faunal remains; of which 6,024 specimens were analyzed further. The majority of the bone represented indeterminate mammal. The identifiable assemblage was dominated by the white-tailed deer (n=1,179) with an MNI of 12 (McCullough and Wright 1997).

Other mammals identified in this assemblage include elk, raccoon, muskrat, beaver, gray squirrel, groundhog, porcupine, dog, and bear. Turkey and crane occur in relatively small numbers in the assemblage. Reptiles are represented by snapping, musk, pond/painted, and softshell turtles, and snake. Fish are represented by sunfish/bass, suckers, largemouth bass, catfish, and gars. Mussel fragments are mentioned but the total number of specimens is not reported. The authors conclude that deer and probably mussel were the most important food animals in the assemblage. Secondary resources include beaver, raccoon, elk, muskrat, bear, woodchuck, and squirrel, with the remainder of identified specimens playing a minor, supplemental role in their diet.

Sugar Creek Site (12Jo289). The Sugar Creek Site (12Jo289) is located on a low terrace to the east of Sugar Creek (McCullough and Wright 1997). The site provided easy access to the uplands on the opposite side of Sugar Creek. The site conditions allowed for excellent bone preservation. The excavations at the Sugar Creek Site yielded 1,381 faunal remains. The majority of the bone represented indeterminate mammal. The identifiable assemblage was dominated by the white-tailed deer (n=479) with an MNI of 12 (McCullough and Wright 1997).

Other mammals identified in this assemblage include bison, coyote, elk, bear, beaver, raccoon, fox squirrel, chipmunk, and mole. Turkey and crane occur in relatively small numbers in the assemblage. Reptiles are represented by water, box, slider, and softshell turtles. A single amphibian element was identified as a frog. Fish elements were not identifiable beyond class. Mussel fragments were absent at this site. The authors conclude that a similar subsistence strategy existed among people at both Sugar Creek and Bundy-Voyles, the only major difference is the lack of mussels at Sugar Creek.

Clampitt Site (12Lr329). The Clampitt site (12Lr329) is primarily assigned to the Oliver Phase, and is reported in Garniewicz 1998. The site is located on the East Fork of the White River. Due to poor bone preservation faunal remains are identified as present and absent. The majority of the bone represented indeterminate mammal. The identifiable specimens that were present at the site was white-tailed deer, turkey, fox squirrel, grey fox, woodchuck, beaver, muskrat, duck, drum, redhorse, and turtle.

Bowen Site (12Ma61). The Bowen Site (12Ma61) was the first Oliver Phase site excavated with faunal remains originally reported by Dorwin (1971). The following specimens were identified as present within the assemblage: white-tailed deer, turkey, raccoon, elk, cottontail rabbit, fox and grey squirrel, woodchuck, beaver, muskrat, mole, drum, and turtle (Garniewicz 1998).

Cox's Woods Site (12Or1). The Cox's Woods Site (12Or1) is located on a floodplain of Lick Creek, a mile from the town of Paoli, Indiana (Redmond and McCullough 1996). The excavations at the Cox's Woods Site yielded a total of 1,868 bone fragments, however due to poor bone preservation only 322 of the specimens were identifiable (Garniewicz 1996). The majority of the identifiable bone was mammalian, which included deer, elk, squirrel, mole, and rabbit. Turkey and sandhill crane represent the only birds in the assemblage. Reptiles are represented by snapping, box, slider, and softshell turtles. All of the fish elements at the site were pharyngeal grinders from a freshwater drum. Mussel fragments were absent at this site. The assemblage contained several types of modified bone: bone beamers made from deer metapodials, awls, a bead, and a scored and snapped antler fragment. The authors conclude that deer, elk, and turkey were important for subsistence at Cox's Woods Site.

Strawtown Enclosure (12H883). The Strawtown Enclosure (12H883) is located on a floodplain terrace at a bend in the White River, Hamilton County, Indiana (White et al. 2002). The Strawtown faunal assemblage contains a total of 1,864 specimens, 23 of which were identifiable to genera or species (Garniewicz 2002:206). The majority of the identifiable remains were white-tailed deer. Other important large mammals identified in this assemblage were elk and bear. Important medium and small mammals identified in the assemblage were raccoon, porcupine, beaver, mice, muskrat, gray fox, domestic dog, and gray squirrel. Birds identified in the assemblage were turkey, grouse, and passenger pigeon. Reptiles included six different turtle species, including: snapping, musk, painted, box, slider, and softshell turtles. Amphibians were represented by several frog specimens. There were few fish in the assemblage, likely do to the lack of floatation samples taken from the site. Fish that were identified were suckers, catfish, and bullhead. The assemblage also contained a large amount of unidentified gastropods and bivalves.

Garniewicz (2002:206-207) notes that the “strong representation of…elk and bear really distinguishes this assemblage from a large number of contemporary sites in Indiana.” We would disagree with this statement. While it is true that few Late Prehistoric site assemblages in north-central Indiana have bear and elk identified in them, the occurrence of these two species at Strawtown is not an anomaly. When one looks at the MNI values for these two species at Strawtown, each is only represented by a single individual. Elk were identified at four of the Oliver Phase sites (Bundy-Voyles, Sugar Creek, Bowen, and Cox’s Woods), and it can be assumed that each site has at least one individual of elk represented. Additionally, both the Bundy-Voyles and Sugar Creek faunal assemblages contained bear, again with at least an MNI of one each. To say that elk and bear are strongly represented at Strawtown is misleading, as Garniewicz does not take into account that there is an obvious under representation of fish, birds, and other small animals, which is most likely due to the lack of sufficient sampling strategies (i.e., column sampling, flotation and/or fine screening).

4.3.6.5.10.3 Comparison of Albee and Oliver Phase Subsistence Patterns

The data from the seven sites presented here allows for a discussion of the differences and similarities between Albee and Oliver Phase subsistence strategies. Albee Phase subsistence patterns are based on dramatically less data than those sites assigned to the Oliver Phase, with only one large site, the Morell-Sheets site, representing the extent of Albee Phase subsistence data. At Site 12-H-993, Feature 5 contains Albee Phase diagnostic artifacts. Not surprisingly, Feature 5 has fewer faunal remains when compared to the entire faunal assemblage from the Morell-Sheets Site. However, the Feature 5 faunal assemblage contains the same basic taxa.

Based on the Morell-Sheets Site data a generalized Albee Phase dietary pattern has emerged. Deer were the primary contributors to the diet, while other medium- and small-sized mammals, birds, turtles, snakes, amphibians, and invertebrates comprised the remainder of the diet. Dog comprised a large portion of the assemblage, but as mentioned above this animal existed within a burial context, and thus, was likely not consumed. There was a general lack of birds in both assemblages. Turtles and fish occur in similar proportions in the faunal assemblage at Morell-Sheets demonstrating the use of aquatic species in the Albee Phase diet.

Based on the six Oliver Phase sites reviewed here, a “typical,” yet generalized, Oliver Phase dietary pattern has emerged. Deer is the most important contributor to the protein portion of the diet. Other medium- and small-sized mammals, turtles, and fish comprised the remainder of the diet. Bear and elk played very minor, and occasional, roles in the diet, if they were present at all in the assemblages. Birds seem to play an especially minor role in the diet of the Oliver Phase people.

It is difficult to determine the differences, if any, between Albee and Oliver Phase faunal remains from the data provided above. Overall, both phases have the same general subsistence pattern, that is focused on resources that are locally available, whether those be from aquatic, floodplain, edge, or wooded environments.

4.3.6.5.11 Conclusions

The total faunal assemblage from the excavations at Site 12-H-993 consists of 9,719 specimens, weighing 1,444.02 g. Of the 9,719 specimens recovered from the site, only 173 specimens were identifiable to genus and species taxonomic levels. Vertebrate faunal remains represent 98.15% of the NISP of the entire assemblage. The mammal faunal remains from Site 12-H-993 comprise 44.48% of the entire NISP assemblage. Birds represents 0.76% of the entire NISP assemblage, reptiles represent 0.19% of the entire assemblage, amphibians represent 0.01%, and bony fish represent 4.57% of the entire assemblage. Invertebrate remains from Site 12-H-993 are represented by 1.85% of the NISP of the entire assemblage.

At site 12-H-993, the majority of the identifiable faunal assemblage is comprised of white-tailed deer. Elk occurs in the assemblage but in a much smaller quantity. Aquatic and semi-aquatic species, as well as turkey, are also present in this assemblage, however in smaller numbers. It is unlikely that the sampling strategy employed at Site 12-H-993 biased the assemblage against smaller animals, as flotation was used. Thus, the occupants of site 12-H-993 likely subsisted heavily on white-tailed deer, and occasionally consumed fish, mussels, and small and medium mammals. This underlying subsistence structure was supplemented with the other taxa identified in the sample. Animals that are represented in the sample in any quantity to speak of (deer, raccoon, squirrel, turkey, catfish, and mussels) are all locally available and thrive in the region. None of the animals represented in the assemblage can be considered “exotic” or non-local to the area.

Evidence of butchering suggests that post-cranial deer skeletons were disarticulated and defleshed prior to consumption. Cut marks were also observed on indeterminate mammal bones and the shaft of a turkey humerus. Modified bone specimens (n=24) in the sample consist of a cut and polished mammal or deer fragments; a single polished deer antler; and a polished mammalian baculum.

The faunal assemblage from Site 12-H-993 site is important because it allows us to draw tentative conclusions about Albee and Oliver Phase subsistence of the Late Woodland and Late Prehistoric periods. However, it is also important to place Site 12-H-993 into the larger picture by comparing the analyzed faunal assemblage with others from Indiana.

A total of seven sites that yielded faunal remains have been chosen for comparisons. Of these, six are assigned to the Oliver Phase, and one to the Albee Phase. The Albee Phase is represented by the Morell-Sheets site, the only Albee habitation site to have been investigated. Those sites with an Oliver Phase component that are used for comparative purposes are: Bowen, Clampitt, Cox's Woods, Bundy-Voyles, Sugar Creek, and Strawtown.

The one Albee Phase site included in the discussion for comparative purposes is the Morell-Sheets Site. At this site white-tailed deer and dog are the most common mammals in the faunal assemblage. Elk occurs at the site but in smaller numbers than deer. Medium-sized mammals appear to play an important role in the diet with a fair amount of squirrel and beaver. Other medium- and small-sized mammals that were present in the faunal assemblage includes: shrews, moles, rabbit, muskrat, vole, porcupine, and raccoon. The use of dog as a food source is arguable, but it is likely that dogs were kept for companions. Respect for this animal is demonstrated with the special burial treatment, which is different from the other animal remains in the assemblage. Turkey only represents a single specimen in the assemblage. Reptiles are represented with box, painted, map, and softshell turtles. Amphibians are represented by a single frog specimen. Fish are represented by sunfish/bass, catfish, and minnows. There is a large amount of a natural accumulation of gastropods at the Morell-Sheets Site.

It appears from the summaries of the faunal assemblages recovered at these six Oliver Phase sites, deer by far played the most important role in the diet. Other large mammals, such as bear and elk are present in many of the assemblages but not in significant numbers. Smaller amounts of small and medium mammals, including coyote, raccoon, squirrels, woodchuck, and beaver, among others, were also hunted. Birds that are common to the sites reviewed here include turkey and crane. The majority of reptiles were only identified as general turtles but the following were also recorded: snapping, box, musk, pond/painted, and softshell turtles, and snake. Fish were also used to supplement the diet, and often include: sunfish/bass, suckers, largemouth bass, catfish, redhorses, and gars.

Based on the data here from the Oliver and Albee Phase sites it is difficult to distinguish the difference between the subsistence strategies of the two cultural periods. Accordingly, it is even more difficult to determine which most closely corresponds to the faunal remains at Site 12-H-993. The fact that there is little difference between the subsistence of the two phases may indicate their close similarities in lifestyle, despite the slight difference in time period. Future work on Albee and Oliver Phase Sites will more clearly define the specific subsistence differences, if there are any, between these two Late Prehistoric phases.

4.3.6.5.12 Recommendations for Future Zooarchaeological Research

In conclusion, we would like to offer some recommendations for future work. The first deals with field sampling strategies practiced at these Late Prehistoric sites, especially those closely associated with aquatic habitats. We propose that column samples be taken from portions of sites that contain middens. The entire column, a 50 cm x 50 cm corner of an excavation unit, should be removed and taken to the lab for processing by dry sieving and hand sorting. While more laborious in nature, column samples have been proven to provide us with a wealth of environmental and subsistence data that cannot be gleaned from more conventional recovery methods.

Second, we recommend a more standardized approach to the recordation and reporting of zooarchaeological data. This was the most difficult aspect of using data recorded for other sites. This might require that zooarchaeologists provide an appendix or comprehensive table that includes all primary and secondary data in reports. This would facilitate better comparisons of data, and if need be, allow future researchers to compute biomass, MNI, or species diversity and equitability numbers, if they are not already provided.

Third, we urge zooarchaeologists to start recording the occurrence of “bone flakes” in assemblages so we may begin to understand the use of marrow prehistorically. Bone flakes are those fragments of large mammal (i.e., deer, elk, bear) longbones that measure 3/4 or less of the total circumference of the diaphysis, and do not contain any portion of the epiphyses. If these bone flakes do prove to be direct evidence of marrow extraction, it will allow us to gain a better understanding of food storage practices as evidence of either subsequent direct consumption or as an ingredient in pemmican.

Fourth, we need to obtain weight and growth data from modern comparative invertebrates so we will be better able to draw conclusions about their use in the Fort Ancient and Mississippian diets, season of capture, and the prehistoric environmental conditions that existed along the major river systems and tributaries in Kentucky.

Last, when aquatic and terrestrial gastropods are recovered in the site assemblage, every effort should be made to identify and interpret them. These non-food specimens can be important proxy indicators of past climatic conditions.

4.3.6.6 Macrobotanical Remains

by Dr. Leslie L. Bush

In 2004, Ball State University Archaeological Resources Management Services excavated portions of site 12-H-993, in the floodplain of the White River in Koteewi Park, Indiana. Investigations focused on Area F, which covers approximately 1.25 acres on the southeastern edge of the site. Area F lies approximately 500 meters from the modern channel of the White River, which is situated to the immediate northwest of the site. The river is believed to have situated itself in its current channel prior to the Late Prehistoric occupation of site 12-H-993. Four radiocarbon intercepts on materials from the site range from 880 to 700 RCYBP, making site occupation transitional between the Late Woodland and Late Prehistoric periods in this part of the midcontinent. Ceramic analysis revealed a cross-mend between Feature 1 and Feature 7, indicating the features are contemporary.

4.3.6.6.1 Site Setting

Site 12-H-993 is located near Strawtown in northeastern Hamilton County, Indiana, where the West Fork White River opens to larger expanses of floodplain (McCullough 2003:150). This location falls within the Tipton Till Plain section of the Central Till Plan natural region, as defined by Homoya and colleagues (Homoya, et al. 1985). Climax forest in this flat region is generally beech-maple forest, but topography and succession also produce significant diversity within the region. Tuliptree, blackgum, hickory, oak, ash, elm, walnut, basswood, and sycamore, among others, are also commonly found in beech-maple forests in Indiana (Braun 1950). In addition, historical sources indicate that prairie resources may have been available nearby. Perhaps the most important ecological zone in the immediate site area, however, would have been floodplain forest. These forests contain a wider diversity of species than do most upland forests, and the species necessarily have a high tolerance for floods and attendant disturbances. The composition of floodplain forests along the White River system in Indiana tends to be quite uniform (Lee 1945). Typical overstory species include sycamore, elms, maples, and willow, all of which were identified in wood charcoal from site 12-H-993. A more complete list of typical species, including understory trees, shrubs and vines, is shown in Table 51.

Table 51 Floodplain Forest Composition (from Lee 1945)			
Canopy	Small Trees	Shrubs	Vines
Boxelder *Acer negundo*	Redbud *Cercis canadensis*	Elderberry *Sambucus canadensis*	Poison ivy *Rhus radicans*
Silver maple *A. saccharinum*	Dogwood *Cornus florida*	Pawpaw *Asimina triloba*	Grape *Vitis* spp.
Hackberry *Celtis occidentalis*	Hawthorn *Crataegus* spp.	Wahoo *Euonymus atropurpureus*	
White ash *Fraxinus americana*		Swamp-privet *Forestiera acuminata*	
Sycamore *Platanus occidentalis*			
Cottonwood *Populus deltoides*			
Swamp willow *Salix nigra*			
American elm *Ulmus americana*			
Rock elm *U. thomasii*			

4.3.6.6.2 Methods

Flotation samples were taken from the west half of the eight cultural features identified site 12-H-993. They were processed at Ball State University in a Flote-Tech flotation machine with bottom mesh openings of 2mm and light fraction mesh of 0.44 mm (Dausman 1989; Hunter and Gassner 1998; Rossen 1999). Heavy fractions were re-processed by hand. Flotation light fractions from eight features, along with charcoal from the reprocessed heavy fractions, were sent to the author for analysis in early 2005.

Each sample was weighed on an electronic balance with a sensitivity of 0.01 g before being size-sorted through a stack of geologic mesh with openings of 2 mm, 1.4 mm, and 0.71 mm. Materials in the > 2 mm size fraction were completely sorted, and all carbonized botanical remains were counted, weighed, recorded, and labeled. For samples where more than 50 wood charcoal fragments were present, counts were estimated from the weight of a random sample of 50 fragments. Other materials in the > 2 mm size fraction were weighed, recorded, and labeled but not counted. All materials in the > 2 mm size fraction other than carbonized plants and bone are referred to as “contamination” in Table 1.2 and on laboratory forms. At site 12-H-993, these materials usually consisted of roots, rootlets, gastropods and soil particles. Materials that fell through the 2 mm mesh, referred to as “residue,” were examined carefully under a stereoscopic microscope at 7-30x magnification for carbonized botanical remains other than nutshell of the hickory-walnut family, corn, and wood charcoal. Nutshell of the beech-oak family was searched for in the residue down to the 1.4 mm size fraction, since it tends to break up in the soil far more easily than nutshell of the more durable hickory-walnut family. All plant material removed from the residue was counted, weighed, and labeled. The presence of taxa in the residue that were not fully carbonized was also recorded on laboratory forms, but these materials were not removed from residue.

Wood charcoal fragments were selected at random from those larger than 2 mm, with large and small fragments chosen alternately until a total of 20 fragments were identifiable to at least the level of ring- or diffuse-porous hardwoods. Fragments were snapped to reveal a transverse section and examined under a stereoscopic microscope at 28-180x magnification. When necessary, tangential or radial sections were examined for ray seriation, presence of spiral thickenings, types and sizes of intervessel pitting, and other minute characteristics that can only be seen at the higher magnifications of this range (Hoadley 1990).

Seeds, fruits, and woody tissue are not always sufficient, by themselves, to allow identification of the plant from which they came to the species level. Botanical materials from site 12-H-993 were identified to the lowest possible taxonomic level by comparison to materials in the author's comparative collection and through the use of standard reference works (e.g., Davis, 1993; Hoadley 1990; Martin and Barkley, 1961; Panshin and de Zeeuw 1980; Schopmeyer 1974; USDA 1971). Some uncarbonized taxa were identified to species through positive identification or elimination of other possible members of the genus. Most commonly botanical materials, whether carbonized or not, were identified to the level of genus. Botanical nomenclature and common names follow the PLANTS national database (USDA-NCRS 2002) except in the cases where the common name in local or archeological use differs significantly from the common name given in the database. Information on the location and growth habits of plants has been taken from Deam 1940. Information about wood properties is from Hoadley 1990 and USDA-FS 2002.

4.3.6.6.3 Results

In all, light fractions and heavy fraction charcoal from 90 liters of soil matrix representing eight features were examined. Five of the features examined were midden-filled earth ovens and three were midden-filled pits. Two of the three pits were deep, bell–shaped pits, and one was a shallow, basin-shaped pit. In addition, two corn cob fragments from Feature 7 were examined and are reported here.

Tables 52 **–** 55 show macrobotanical remains recovered by flotation and identified for site 12-H-993. Table 52 indicates the presence or absence of seeds that were not fully carbonized. Table 53 shows results of wood charcoal analysis. Tables 54 and 55 show carbonized macrobotanical remains by count and weight, respectively.

Table 52 Macrobotanical Remains from site 12-H-993 Uncarbonzied seeds Presence/absence									
Feature	**1**	**2**	**3**	**5**	**7**	**8**	**9**	**10**	
Type	Bell-shaped Pit	Earth Oven	Earth Oven	Bell-shaped Pit	Earth Oven	Basin-shaped Pit	Earth Oven	Earth Oven	**Total Occurrences**
Level	6	5	5	4	6	1	5	5	
Depth (cm below surface)	124	122	139	115	11	51	97	88	
Cat # 04.50.	11.6	12.5	13.5	15.4.4	17.6	18.1	19.5	20.5	
Liters processed	10	11	10	13.5	13	10	12.5	10	
Purslane (*Portulaca oleracea* L.)			X	X	X	X		X	5
Amaranth (*Amaranthus* L.)	X		X	X			X		4
Blackberry (*Rubus* L.)			X		X			X	3
Grass family seeds (Poaceae)			X		X	X			3
Chenopodium (*Chenopodium* L.)	X					X			2
Carpetweed (*Mollugo* L.)					X			X	2
Mullein (*Verbascum* L.)				X					1
Chickweed (*Stellaria* L.)						X			1
Copperleaf (*Acalypha* L.)						X			1

Table 53
Macrobotanical Remains from site 12-H-993
Wood charcoal counts and weights

Feature	**1**		**2**		**3**		**5**		**7**		**8**		**9**		**10**		**Site Total**	
Level	6		5		5		4		6		1		5		5			
portion	W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2			
Cat # 04.50.	11.6		12.5		13.5		15.4.4		17.6		18.1		19.5		20.5			
	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)
White oak (*Quercus* L. subgenus Quercus)	12	0.32	12	0.13	8	0.14	3	0.04	13	0.39	14	0.2	12	0.22	4	0.08	78	1.52
Sycamore (*Platanus occidentalis* L.)	3	0.08	2	0.02	1	0.01	2	0.01	3	0.08	2	0.05	6	0.11	3	0.09	22	0.45
Beech (*Fagus grandifolia* Ehrh.)					2	0.02			1	0.02			1	0.01	10	0.2	14	0.25
Ash (*Fraxinus* L.)	3	0.05	2	0.02	3	0.05			1	0.03	3	0.02					12	0.17
Maple (*Acer* L.)	1	0.08	2	0.02			3	0.05							1	0.01	7	0.16
Hickory (*Carya* Nutt.)	1	0.01			5	0.12	1	0.01									7	0.14
Elm (*Ulmus* L.)			1	0.04	1	0.03	1	0.01	1	0.06	1	<0.01					5	0.14
Chestnut (*Castanea dentata* [Marsh] Borkh.)							3	0.17									3	0.17
Willow (*Salix* L.)															1	0.01	1	0.01
Red oak (*Quercus* L. subgenus Lobatae)									1	0.03							1	0.03
Walnut/butternut (*Juglans* L.)													1	0.07			1	0.07
Buckeye (*Aesculus* L.)															1	0.03	1	0.03
Total Identified	20		19		20		13		20		20		20		20		152	3.14

Table 53 (cont.)
Macrobotanical Remains from site 12-H-993
Wood charcoal counts and weights

Feature	**1**		**2**		**3**		**5**		**7**		**8**		**9**		**10**		**Site Total**	
Level	6		5		5		4		6		1		5		5			
portion	W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2		W 1/2			
Cat # 04.50.	11.6		12.5		13.5		.15.4.4		17.6		18.1		19.5		20.5			
	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)	count	wt (g)
Ring-porous hardwood							2	0.06									2	0.06
Diffuse-porous hardwood			1	0.01			5	0.02					1	0.02			7	0.05
Unidentifiable hardwood					1	0.02											1	0.02
Unidentifiable wood tissue							3	0.01			3	0.03					6	0.04

Table 54
Macrobotanical Remains from site 12-H-993
Raw counts

Feature	**1**	**2**	**3**	**5**	**7**	**8**	**9**	**10**	
Type	Bell-shaped Pit	Earth Oven	Earth Oven	Bell-shaped Pit	Earth Oven	Basin-shaped Pit	Earth Oven	Earth Oven	
Level	6	5	5	4	6	1	5	5	
Cat # 04.50.	11.6	12.5	13.5	15.4.4	17.6	18.1	19.5	20.5	**Site Total**
Liters processed	10	11	10	13.5	13	10	12.5	10	90
Wood charcoal	1030	91	483	28	1432	329	1186	311	4890
Bark		4							4
Corn (*Zea mays* L.)									
kernels	21	1	4		22	8	33	11	100
cupules/glumes	85		1		39	3	35	29	192
Native cultigens									
Chenopodium (*Chenopodium* L.)			1						1
Maygrass (P*halaris caroliniana Walt.*)					2				2
Nutshell									
Acorn (*Quercus* L.)	3				5*	36*			43
Hickory (*Carya* Nutt.)	9	1	1						11
Hickory/walnut family (Juglandaceae)	4				5	1			10
Beech (*Fagus grandifolia* Ehrh.)					2				2
Wild plant seeds									
Panicgrass (*Panicum* L.)	38		5	1	74		4	2	124
Blackberry (*Rubus* L.)	3	1		1	4		3	2	14
Purslane (*Portulaca oleracea* L.)	2			2	6			1	11
Sumac (*Rhus* L.)	4				1		1		6
Grass family seeds (Poaceae)	1		4		1				6
Nightshade (*Solanum* L.)	2		1				1		4
Grape family (Vitaceae)					2				2
Strawberry (*Fragaria* L.)					2				2
Plum (*Prunus* L.)					1				1
Black-eyed Susan (*Rudbeckia hirta* L.)								1	1
Carpetweed (*Mollugo* L.)								1	1
Unidentifiable seeds	3	2			7		3	4	19

Table 54 (cont.)
Macrobotanical Remains from site 12-H-993
Raw counts

Feature	**1**	**2**	**3**	**5**	**7**	**8**	**9**	**10**	
Type	Bell-shaped Pit	Earth Oven	Earth Oven	Bell-shaped Pit	Earth Oven	Basin-shaped Pit	Earth Oven	Earth Oven	
Level	6	5	5	4	6	1	5	5	
Cat # 04.50.	11.6	12.5	13.5	15.4.4	17.6	18.1	19.5	20.5	**Site Total**
Miscellaneous									
Monocot stem					1				1
Other stem tissue								31	31
Unidentifiable botanical material	10		9	3	19	29	28	18	
Fungus					5			1	
*Fea 7 includes 2 <2mm; Fea. 8 includes 24									

Table 55
Macrobotanical Remains from site 12-H-993
Weights in grams

Feature	1	2	3	5	7	8	9	10	
Type	Bell-shaped Pit	Earth Oven	Earth Oven	Bell-shaped Pit	Earth Oven	Basin-shaped Pit	Earth Oven	Earth Oven	
Level	6	5	5	4	6	1	5	5	
Depth (cm below surface)	124	122	139	115	11	51	97	88	
Cat # 04.50.	11.6	12.5	13.5	15.4.4	17.6	18.1	19.5	20.5	**Site Total**
Liters processed	10	11	10	13.5	13	10	12.5	10	90
Wood charcoal	11.74	0.89	6.95	0.39	16.33	3.09	16.13	7.4	62.92
Bark		0.06							0.06
Corn (*Zea mays* L.)									
kernels	0.15	<0.01	0.05		0.1	0.05	0.55	0.34	1.24
cupules	0.43		0.01		0.2	0.02	0.24	0.17	1.07
Native cultigens									
Chenopodium (*Chenopodium* L.)			<0.01						<0.01
Maygrass (P*halaris caroliniana Walt.*)					<0.01				<0.01
Nutshell									
Acorn (*Quercus* L.)	0.01				0.01	.07*			0.09
Hickory (*Carya* Nutt.)	0.05	<0.01	0.01						0.06
Hickory/walnut family (Juglandaceae)	0.01				0.02	0.01			0.04
Beech (*Fagus grandifolia* Ehrh.)					0.01				0.01
Wild plant seeds									
Panicgrass (*Panicum* L.)	0.01		<0.01	<0.01	<0.01		<0.01	<0.01	0.01
Blackberry (*Rubus* L.)	<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	--
Purslane (*Portulaca oleracea* L.)	<0.01			<0.01	<0.01			<0.01	--
Sumac (*Rhus* L.)	0.01				<0.01		<0.01		0.01
Grass family seeds (Poaceae)	<0.01		<0.01		<0.01				--
Nightshade (*Solanum* L.)	<0.01		<0.01				<0.01		--
Grape family (Vitaceae)					<0.01				--

Table 55 (cont.)
Macrobotanical Remains from site 12-H-993
Weights in grams

Feature	**1**	**2**	**3**	**5**	**7**	**8**	**9**	**10**	
Type	Bell-shaped Pit	Earth Oven	Earth Oven	Bell-shaped Pit	Earth Oven	Basin-shaped Pit	Earth Oven	Earth Oven	
Level	6	5	5	4	6	1	5	5	
Cat # 04.50.	11.6	12.5	13.5	15.4.4	17.6	18.1	19.5	20.5	**Site Total**
Wild plant seeds (cont.)									
Strawberry (*Fragaria* L.)					<0.01				--
Plum (*Prunus* L.)					0.02				0.02
Black-eyed Susan (*Rudbeckia hirta* L.)								<0.01	--
Carpetweed (*Mollugo* L.)								<0.01	--
Unidentifiable seeds	<0.01	<0.01			<0.01		<0.01	<0.01	--
Miscellaneous									
Monocot stem					0.02				0.02
Other stem tissue								0.06	0.06
Unidentifiable botanical material	0.1		0.05	0.01	0.1	0.17	0.15	0.13	0.71
Fungus					0.11			0.01	0.12

*Includes 0.03 g <2mm

4.3.6.6.3.1 Uncarbonized plant remains

On open-air sites in the Eastern Woodlands, uncarbonized plant material can be assumed to be of modern origin unless compelling evidence suggests otherwise (Lopinot and Brussell 1982). To date, sites in Koteewi Park have offered no compelling evidence, and only fully carbonized plant remains are treated here as ancient remains. Following Pearsall (2000:110), complete monochromatic blackening is the criterion used for determining carbonization, especially in cases where the fresh seeds are also black. Some humified remains may occasionally become completely black in color, however (Cook 1964). The carpetweed seed (*Mollugo* L.) is the most likely candidate for a humified modern seed in Tables B.3 and B.4. Although some archaeologists treat this genus as native (e.g., Pauketat et al. 2002), many botanical authorities do not (e.g., USDA 1971, Deam 1940). The author confesses to grave doubts as to the antiquity of this specimen.

Uncarbonized or partially blackened macrobotanical remains at site 12-H-993 are relatively rare. Other than roots and rootlets, the uncarbonized remains consist of seeds of weedy plants that quickly colonize disturbed areas such as the floodplain on which site 12-H-993 is located (Table 52). All of the plants in Table 52 are annuals except blackberry (*Rubus* L.), whose canes fruit only during the second year of growth.

Six of the taxa in Table 52 are also found among the carbonized plant remains on the site. These are: purslane, amaranth, blackberry, grass family seeds, chenopodium, and carpetweed. Because the Koteewi vicinity is unusual in Indiana in yielding a continuum of blackened, partially blackened, and unblackened seeds, some of the fresh seeds in Table 52 may represent preserved ancient remains, especially given the depths from which the samples were excavated. As indicated in Figure 85, however, the primary determinant of taxa abundance for uncarbonized species at site 12-H-993 is the depth of the sample. The coefficient of correlation between depth and number of uncharred taxa is –0.48. Thus, the vast majority of fresh seeds at site 12-H-993 are almost certainly modern seed rain that has worked its way into the soil. The presence of some taxa in both carbonized and uncarbonized form most likely indicates the continuity of conditions favorable to the growth of these plants in Koteewi Park over the past 900 years.

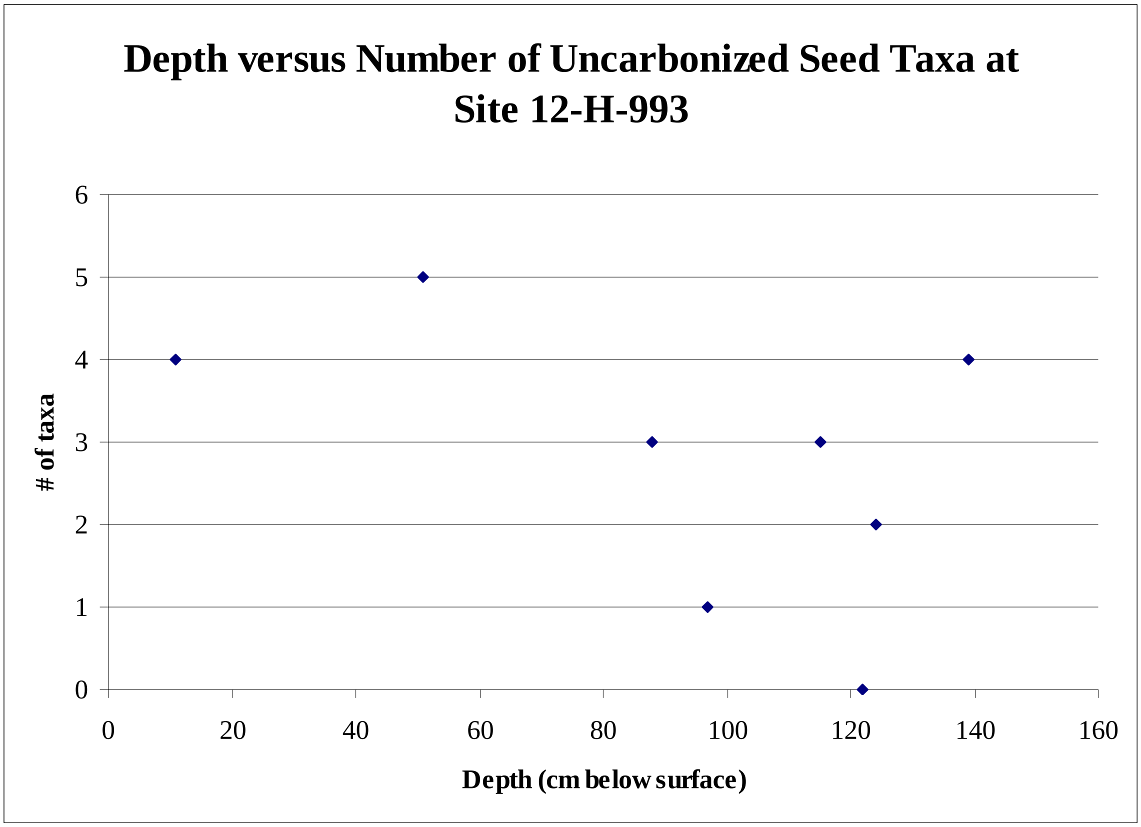

Figure 85. Depth versus number of uncarbonzied seed taxa.

4.3.6.6.3.2 Carbonized plant remains

Wood charcoal. Twelve taxa of wood charcoal were identified to the genus, subspecies, or species level at site 12-H-993 (Table 53). Oak of the white group was the most common wood, followed by sycamore, beech, and ash. Together, white and red oak constituted 52% of the wood charcoal assemblage. Oak is among the most dense of the common North American woods, with the most common oaks having specific gravities around 0.70 when dry (USDA-FS 2002). Such density means that oaks tend to burn at higher temperatures than other woods, making them excellent fuel (Graves 1919). Many of the less common species of oaks prefer habitats along streams or in low woods. The two most common species of oak in Indiana, however, grow in dry situations. These are white oak (*Q. alba* L.), the principal member of the white oak group, and black oak (*Q. velutina* Lam.), which is a member of the red oak group. The other taxa of wood charcoal recovered from site 12-H-993 either prefer wet or floodplain situations (e.g., sycamore, willow) or include species that tolerate such conditions (e.g., hickory). The wood charcoal assemblage appears to reflect resources within easy reach of the site, the immediate floodplain and perhaps higher ground across the White River.

Corn and Possible Cultigens. After wood charcoal, corn is the next most common macrobotanical taxon recovered from site 12-H-993. Two hundred ninety-three corn fragments were recovered from seven of the eight samples examined. Only Fea. 5 failed to yield corn remains, and this feature contained generally low densities of all artifact/ecofact classes. Cob fragments (kernels and glumes, n=192) outnumbered kernel fragments (n=100) by nearly two to one, but kernels (g=1.24) weigh slightly more than the cupules (g=1.07). Despite corn's ubiquity, it is only moderately abundant. Densities of corn (measured either by corn counts or weights per liter) at site 12-H-993 are approximately equivalent to those at the Castor Farm site, a contemporary or slightly earlier site in Koteewi Park, but less than the corn density found at the Oliver component at the Strawtown site, a later site in the Park.

In addition to the fragmentary kernels, cupules, and glumes recovered through flotation, two intact corn cob fragments were recovered by hand from Fea. 7. Numeric descriptions are given in Table 56.

Table 56
Corn cob fragments from Fea. 7 at site 12-H-993
Catalog # 04.50.17.9.23

Specimen	Weight (g)	Height	Cross-section	Row number
1	1.00	23.8 mm 6-7 cupules	12.4 x 10.3 mm square	8
2	1.08	21.8 mm 6 cupules	13.1 x 10.8 mm square	8

The corn appears consistent with late Prehistoric corn found in central Indiana. Only a handful of other corn cob fragments with measurable numbers have been found in central Indiana, most of them belonging to the Oliver Phase, which is slightly later than site 12-H-993. All but one of these have been 8-rowed, making central Indiana corn more like that grown by Fort Ancient and other groups to the east and the northeast than the varieties grown by Mississippian and other southeastern groups.

The lone specimen of chenopodium at the site is dirty and incomplete. It has truncate margins in cross-section, however, and is therefore included among the domesticated plants. No morphological correlates of identification have been identified for maygrass, but it was widely cultivated among Middle and Late Woodland groups in the midcontinent. Maygrass is not believed to be native to central Indiana by either botanical or archaeological authorities (Cowan 1978; Deam 1940; USDA-NCRS 2002). Maygrass thus represents a third probable crop for site inhabitants. Based on agricultural patterns elsewhere in the midcontinent, it is likely that squash/gourds and tobacco were also grown, and perhaps little barley as well.

Nutshell. Nutshell was sparse at site 12-H-993, with only 66 fragments weighing 0.2 g recovered. Two-thirds of these were acorn (n=41), which requires special processing to reduce tannins before it can be successfully consumed by humans. Although acorn is the dominant nutshell at some archaeological sites, most contain far larger quantities of hickory. It is possible the acorns at 12-H-993 were burned because of their association with oak firewood rather than as a byproduct of human consumption. That the same feature that yielded the largest amounts of acorn also had the greatest percentage of oak wood charcoal (Fea. 8) supports this interpretation. The general paucity of nutshell on the site may reflect season of occupation, but it may also reflect emphasis on some other subsistence activity.

Wild seeds. By far the most common small wild seed at site 12-H-993 is panicgrass (*Panicum* L.; n=124). *Panicum* is a large and diverse genus of the millet tribe of grasses. In Indiana, the different species flower anywhere from June through October, with most species flowering in either June or September. The tiny seeds would have been available shortly thereafter. Panicgrass is often found on archaeological sites, sometimes in quantity, and is referred to in the American Bottom as Graminae (Poaceae) 6L. There are three primary possibilities to explain the presence of its seeds in 6 of the 8 features at site 12-H-993: It may be a harvest contaminant, a crop in itself, or byproduct of use of the grass stems for basketry or other crafts. Daniel Moerman, who has compiled known uses of plants by 291 Native American groups, records food uses for panicgrass seeds mostly by western groups such as Hopi, Navajo, Apache, and Cocopa (Moerman 1998:376-377). The only use recorded for an eastern group is by Cherokees to line the inside of moccasins (Moerman 1998:377)

Most other wild plants recovered from site 12-H-993 have important food uses. These are: blackberry, grape, plum, strawberry, purslane (eaten as a green), and sumac (which also has uses as a dye). Grass seeds other than panicgrass may be present as incidentals or as byproducts of fiber use. Nightshade greens were prized as potherbs among historic Cherokees, and the ripe berries may be eaten when fully ripe (Moerman 1998:535).

4.3.6.6.4 Discussion

4.3.6.6.4.1 Intrasite patterning

Features at site 12-H-993 exhibit little difference in their macrobotanical contents, although some have greater densities of remains than others. Features 1, 7, and 9 contain greater densities of wood charcoal, corn, and small seeds than do the other features, but the plant types recovered do not differ from the other features. In addition, different classes of features do not systematically differ from each other in their botanical contents or densities. Features 7 and 9 are midden-filled earth ovens while Feature 1 is a bell-shaped pit filled with midden. The similarity of macrobotanical remains throughout the features likely reflects the secondary nature of the midden deposits (generated from similar activities or composite midden from many activities) and not the primary use of these features. In addition, all excavated features come from only a portion of the site (Area F) and may reflect use of this area for limited activities.

All plant resources reflected in the macrobotanical remains are local or potentially so. The plant remains document exploitation of several nearby ecological zones. Use of floodplain resources is indicated by several wood charcoal taxa (sycamore, ash, willow, maple) and the grape seed. Corn also represents floodplain exploitation, since it was most likely grown in fields cleared from the rich, flat soil near the river. Grasses may indicate exploitation of local prairie areas near the site, perhaps for fiber. Edge species are represented by sumac and blackberry. Many species listed here, and many of the remaining species, are anthropogenic plants, thriving in the disturbed conditions associated with extended human occupation. True wetland species are not represented in the macrobotanical record, although a marshy area is currently present to the south and east of the site.

4.3.6.6.4.2 12-H-993 in local perspective

Macrobotanical remains have now been analyzed from five Late Prehistoric sites in the Koteewi Park locality, making it possible to look for emerging patterns in the archaeological record. Macrobotanical remains from the five sites are summarized in Table B.7, along with those from the Prairie View/Moffit Farm site. This site (12-H-6/46) lies downstream from site 12-H-993. It is roughly contemporary with 12-H-993 and Castor Farm (12-H-3) and contains similar ceramics of the Great Lakes Late Woodland tradition. (Feature 5 at site 12-H-993 yielded Albee sherds, but it contains so few macrobotanical remains that the plant remains reflect a substantially Great Lakes Late Woodland occupation.) The other sites are Strawtown (12-H-883), which contains an earlier, Oliver, component, and a later component that also includes Taylor Village ceramics. The final site, 12-H-1057, is a Taylor Village site.

Three trends are notable in Table 57. First, the percentage of oak in the wood charcoal assemblage generally increases through time. This may reflect ecological changes associated with climactic cooling during the 14th century and the onset of the Neo-Boreal around A.D. 1350. The increase in oak wood may also reflect depletion of floodplain wood resources by Late Prehistoric agriculturalists, pushing the search for firewood into the terraces and uplands. The increasing rank of sumac supports the latter hypothesis. This small tree or shrub colonizes old fields and forest edges, suggesting increased acreage has been opened for agriculture.

Table 57
Descriptive statistics for six sites near site 12-H-993

Site	Liters	Nutshell/ Wood (g)	% Oak wood charcoal	Sumac rank among wild plants	Nutshell (g)/liter	Corn (g)/liter
12-H-6/46*	120	0.01	unknown	6	0.01	0.03
12-H-3	145	0.01	34	7	0.01	0.04
12-H-993	90	0.00	52	5	0.00	0.03
12-H-883 (early)	100**	0.01	30.5	2	0.03	0.11***
12-H-883 (late)	38.5	0.06	57.7	n/a	0.06	0.01
12-H-1057	40**	0.06	61	2	0.03	0.00

*Site outside Strawtown Bottoms but roughly contemporary with 12H3 and 12H993
**Literage from these sites is estimated conservatively. Some flotation samples were not measured before processing.
***Corn adjusted to account for mass of burned corn in Fea. 7A

As shown Figure 86, use of nut resources may decrease and then increase over time in the Koteewi Park locality. Nut weight increases for the two latest sites, Taylor Village occupations, both in absolute terms (when measured in relation to liters processed at the site) and in relation to wood charcoal. Corn appears to exhibit the opposite trend, increasing and then decreasing. Given the conflicting scheduling demands of nut harvesting and the processing of a late corn crop, the mirrored trends are not surprising. Sample sizes from the Taylor Village sites are small, however, making it difficult to evaluate the strength of these trends in nut and corn use.

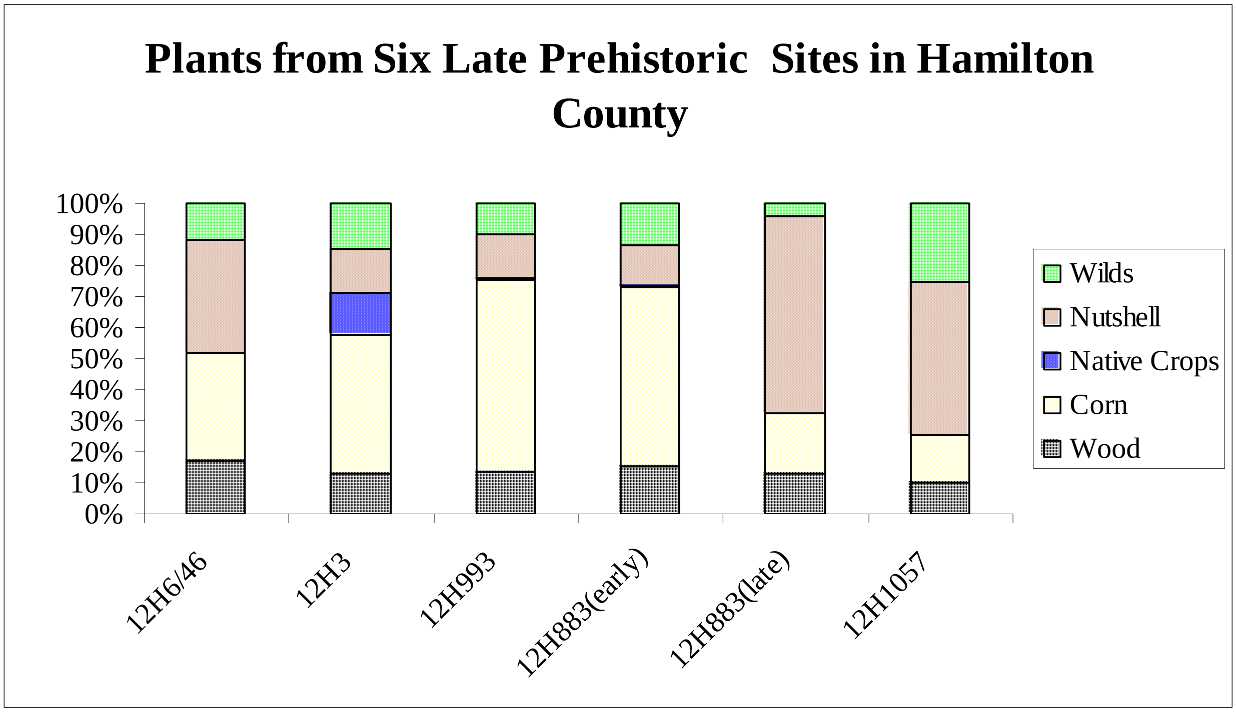

Figure 86. Plants from six Late Prehistoric sites in Hamilton County.

4.3.6.6.5 Conclusion

Despite the small number of features analyzed from site 12-H-993, the data recovered make important contributions to our emerging understanding of plant use in the Koteewi Park locality. Corn at site 12-H-993 is ubiquitous and moderately abundant. Evidence for other crops is present but scarce in the two specimens of maygrass and the single domestic-shaped chenopodium recovered. Nutshell is scarce, but other wild plant remains are common. Macrobotanical remains reflect exploitation of local or potentially local resources, including floodplain and upland forests, edge species, and prairie.

4.3.6.7 Function

Interpreting the function of features is often the most daunting task of archaeology. Each of the features excavated at 12-H-993 served a final function for refuse disposal. As Hall (1962:22) pointed out, identifying features filled with midden as refuse pits can be misleading since it is unlikely the pits were intended to serve solely for refuse disposal. It is more likely that the features were multifunctional. The cultural features exposed and excavated were grouped into three types based primarily on constructional attributes: earth ovens, deep pits and shallow pit.

4.3.6.7.1 Feature Types

The most numerous features were most likely built as earth ovens. Features 2, 3, 7 and 10 all had a layer of charcoal underneath fire-cracked rock at the bottom of the feature. There was some variation in the features in regards to size and depth; Feature 3 had a very thick layer of fire-cracked while Feature 7 had a discontinuous layer. Feature 10 was the smallest in volume of this type. However, all four features were striking similar. They each had heat-reddened walls indicating at least one burning episode. Feature 9 was very similar to the features interpreted as earth ovens. However, this feature did not contain a layer of charcoal and fire-cracked rock at the bottom. It is possible that the pit had been cleaned out. The reddened walls of the feature certainly indicate that burning occurred within this feature. Feature 9 is, therefore, more tentatively identified as an earth oven. The final use of these features was for refuse disposal.

The original function of Features 1 and 5 was difficult to infer. There was no evidence for use as an earth oven, although the feature size is comparable with the other features interpreted as such. It is unlikely these features served as storage pits. Both were excavated into the Pleistocene gravel and seasonally high water tables would inundate the feature and spoil food or other organic supplies. Flooding of the features from ground water was amply demonstrated during our field project. The excavation was interrupted when the water table rose and flooded the lower portions of the features. The only demonstrable function for Features 1 and 5 is the final purpose as a refuse pit. There was a cross-mend of ceramic sherds between Features 1 and 7, so the features may have been in use at the same time or at the least the midden deposits were contemporary.

The original function of Feature 8 was equally difficult to discern. The feature was unlike any of the others excavated at the site in terms of its small size and shallow depth. The midden-derived contents were very similar to the other features. The final function this feature was also for refuse disposal.

4.3.6.7.2 Discussion

Cooking and refuse disposal were the only clearly demonstrable functions identified for the features from site 12-H-993. Exactly what was being cooked in the earth oven was not known. The contents were removed and as a final use the pits were filled with trash. The midden contained food remains of both plants and animals that may or may not represent what was cooked in the ovens. The floral and faunal analyses provided an assortment of foods that could be potentially cooked in the ovens: deer, elk, turkey, raccoon, squirrel, turtle, fish, mussel, corn or acorn. Only plant remains that were carbonized were considered to be viable archaeological samples, but food cooked in earth ovens may not be carbonized since the intent was to roast or steam the food. For example, steaming corn in a pit was conducted by adding a sequence of red hot stones, a layer of husks, a layer of ripe corn, another layer of husks, a layer of earth and finally adding water (Ritzenthaler and Ritzenthaler 1970:15-16).   The disposal of refuse may also be prescribed by cultural traits and ritual precautions may bias what food remains occur in midden (Hall 1962:25-26). At site 12-H-993, if midden was disposed of in areas other than the pit features, cultivation would have leveled and dispersed the heaps.

The only other tentative idea of feature function was found in Feature 1. The calcium carbonate or quick lime deposit found in the feature may indicate specialized food processing. Lime from either limestone or lye water from potash was documented in aboriginal processing of corn for hominy (McElrath et al. 2000:21, Witthoft 1949:3).

When comparing the large pit features with Albee or Oliver Phase sites, these pits do not occur with great frequency. They were unknown from Albee Phase sites and there were fewer than 10 such features reported at the Bowen site (Dorwin 1971). Smaller and shallower ovens, hearths and storage pits were more commonly documented for Albee and Oliver Phase sites (McCord 2001; McCord and Cochran 1994; McCullough 2000, 2003; McCullough et al. 2004; McCullough and Wright 1997; Redmond and McCullough 1996; White et al. 2002; 2003). Deep roasting pits were noted at the Griesmer site in Lake County associated with a Fisher/Huber occupation (Faulkner 1972). The remains of charred white water lilies were found near the bottom of some of these pits, suggesting the tubers were roasted (Faulkner 1972:45).

Large, deep, multifunctional pits from the Late Woodland period have been documented in other regions of the Midwest (McElrath et al. 2000:18, McElrath and Fortier 2000:105). These large pits have been suggested to represent communal pooling of resources (Seeman and Dancy 2000:591). All of the features excavated, except for Feature 8, may have served a community function. Based on the small size of Feature 8, may have served a single household.

The large pits encountered at 12-H-993 may be the result of communal activities, but are somewhat unique to other contemporary sites in the immediate region. The radiocarbon chronology (presented below) documents a long term use of the site and Feature 10 intruding into Feature 13 indicates repeated use of the site. The site setting on the valley floor that is actively inundated in modern times, suggests the site was likely seasonally occupied. Perhaps, site 12-H-993 served a special function within the Late Woodland/Prehistoric settlement system.

One of the best known ceremonies documented for horticultural Native Americans was a first fruits or green corn ceremony (Witthoft 1949:4-5). Green corn ceremonies were typically held when the corn first became available for food and served as renewal festivals to offer thanks for the gifts of foods, pray that good fortune would extend into the future and hope that winter would not arrive until the crops were harvested (Witthoft 1949). Common elements of green corn ceremonies included: communal involvement, though men and women had different roles; multi-day observance (four days was most typical); dancing; singing; feasting; extinguishing old fires and lighting new fires; and cleansing or cleaning of the ceremonial area (Witthoft 1949, Beth Glenn personnel communication 2005). While green corn or first fruit ceremonies had evolved with Euroamerican acculturation pressures, the festival was a major and integral part of the yearly cycle of horticultural societies and was not considered a recent development (Witthoft 1949). Folk-lore, mythology, diverse cultural meanings and ritual were all testaments to the importance of corn for Native horticulturists (see Johannessen and Hastorf 1994).

Green corn ceremonies may not have been the specific activity conducted at site 12-H-993, but this festival represents one possible explanation for the presence of communal features. Corn was common in the plant remains recovered from the site, but not unusually so. It is unclear in what quantity corn should be expected in the archaeological record for such ceremonies. Green corn feasts did incorporate a variety of foods other than corn and corn can be processed in many ways that may not lead to carbonization. A substantial midden accumulated at the site, but no distinguishable ceremonial structures or habitation structures were encountered. If structures resembled wigwam types, than it is unlikely evidence of their presence would have survived cultivation. While it is not clear what specific activities occurred at the site, the features do seem unique in the region and they apparently served a communal purpose.

4.3.6.7.3 Summary

The features indicate that site 12-H-993 probably served a special communal purpose in a broader settlement system. The material remains recovered do not clearly indicate that the site was specifically used for green corn ceremonies, but community based activities were suggested. Only a small portion of the site was tested during this project and it could represent a specialized area of the site; however, other data argue against this. Two other features encountered at different locations in site 12-H-993 were also large earth oven/refuse pits (Cantin et al. 2003). The midden contents and radiocarbon date recovered from these features clearly associate the features with the ones recovered during this project. It would appear at this time that the large earth oven/refuse pits are typical of the site and not a particular use area.

4.3.7 Radiocarbon Dates

Four samples were submitted for radiocarbon dating (Table 58) (Figure 87). One sample from Features 2, 3 and 10 were taken from wood charcoal at the bottom of the feature underlying the bottom layer of fire-cracked rock. These samples should represent the use of the features as earth ovens. These samples had adequate carbon for standard radiometric dating. One sample from a corn cob found in the midden near the bottom of Feature 7 was submitted for AMS dating. Since this sample was taken from the midden, it does not necessarily date the construction or use of the feature. However, since corn is an annual crop it should provide a better date than wood charcoal that was potentially "old" wood when it was burned. Table 58 also provides a date from a feature at 12-H-993 encountered by ISU during a subsurface investigation (Cantin et al. 2003). For comparison all samples were calibrated with a 2-sigma deviation by CALIB 4.4 using the intercal98.14c calibration data set (Struever and Reimer 1993).

Table 58
12-H-993 Radiocarbon Dates

Conventional Age	2-sigma Calibrated Age	Sample No.	Context
880 +/- 60 BP	AD 1030 to 1260	Beta -199996	Feature 2
820 +/- 40 BP	AD 1160 to 1280	Beta -199998	Feature 7
730 +/- 50 BP	AD 1210 to 1390	Beta -199999	Feature 10
700 +/- 60 BP	AD 1220 to 1400	Beta - 199997	Feature 3
630 +/- 60 BP	AD 1280 to 1420	Beta - 175003	ISU Feature 1

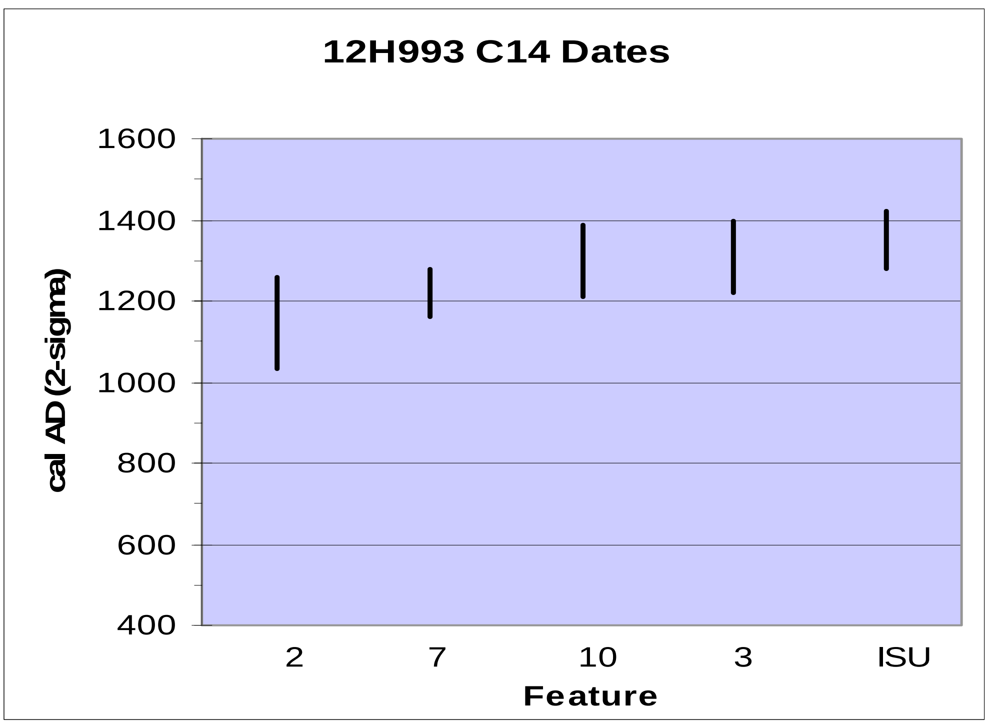

Figure 87. 12-H-993 Radiocarbon dates.

The dates from 12-H-993 range between cal AD 1030 and 1420 and overlap during the period of cal AD 1160 and 1400. In comparison with other central Indiana Late Woodland/Prehistoric manifestations, these radiocarbon dates fall within Oliver Phase, cal AD 1200 to 1450, and the Albee Phase, cal AD 800 to 1300. If the range of dates is examined, the dates from 12-H-993 are 100 to 200 years too early for Oliver and 100 to 150 years too late for Albee.

To examine the relationship of 12-H-993 to other central Indiana manifestations, the dates were compared to Albee Phase sites and a few "Oliver Phase" sites (Figure 88). From the "Oliver Phase," sites with only the Bowen series ceramics (Dorwin 1971) like those recovered from 12-H-993 were examined. The Fort Ancient ceramics assigned to the Oliver Phase appear to be later, and in contrast to the most current interpretation (ie McCullough 2000, McCullough et al 2004), part of a separate ceramic tradition (ie McCullough 1993). Seriation of Oliver Phase ceramics including both Fort Ancient styles and Bowen styles (Great Lakes Impressed) concluded that the Great Lakes Impressed styles occur earlier in time (McCullough 2000, McCullough et al. 2004). Table 59 shows the Albee sites and dates examined. The sites utilized are more restrictive than previously documented (McCord 2001) since dates/sites with a mixed component context and sites lacking wedge-shaped collared ceramics were excluded. Table 60 shows the sites with Bowen series ceramics. Other sites, such as 12-Ma-4 (Bosson) appear to have a dominance of Bowen series ceramics, but the assemblage at Bosson may contain Fort Ancient ceramics and the site was not included.

Table 59
Albee Radiocarbon Dates

Site	Conventional Age	2-sigma Calibrated Age	Sample No.	Reference
12La522	1120 +/- 40 BP	AD 860 to 1000	Beta- 201170	McCullough, per. communication 2005
Jarrett (12Dl689)	1020 +/- 70 BP	AD 890 to 1190	Beta-127453	McCord 2001
	1000 +/- 70 BP	AD 930 to 1190	Beta-127454	McCord 2001
	930 +/- 70 BP	AD 1000 to 1250	Beta-127452	McCord 2001
Morell-Sheets (12My87)	1100 +/- 60 BP	AD 800 to 1020	Beta-55448	McCord and Cochran 1994
	1160 +/- 60 BP	AD 770 to 1000	Beta-30894	McCord and Cochran 1994
	910 +/- 50 BP	AD 1020 to 1210	Beta-55451	McCord and Cochran 1994
	860 +/- 60 BP	AD 1040 to 1280	Beta-30895	McCord and Cochran 1994
	870 +/- 60 BP	AD 1030 to 1260	Beta-55449	McCord and Cochran 1994
	840 +/- 60 BP	AD 1040 to 1280	Beta-55447	McCord and Cochran 1994
	800 +/- 60 BP	AD 1040 to 1300	Beta-55452	McCord and Cochran 1994
	760 +/- 50 BP	AD 1160 to 1300	Beta-55450	McCord and Cochran 1994
	680 +/- 70 BP	AD 1220 to 1400	Beta-55453	McCord and Cochran 1994
Hesher (12Hn298)	1430 +/- 60 BP	AD 530 to 690	Beta-22127	Cochran et al. 1988
	1050 +/- 80 BP	AD 800 to 1160	Beta-22128	Cochran et al. 1988
	1000 +/- 50 BP	AD 960 to 1160	Beta- 22126	Cochran et al. 1988
Lattas Creek (12Gr29)	1000 +/- 80 BP	AD 890 to 1220	Beta-18341	Pace 1986

Table 60 Bowen Series Radiocarbon Dates				
Site	Conventional Age	2-sigma Calibrated Age	Sample No.	Reference
Castor Farm (12H3)	1070 +/- 90 BP	AD 770 to 1160	Beta-180644	McCullough et al. 2004
	920 +/- 40 BP	AD 1020 to 1190		McCullough, per. communication 2005
	910 +/- 40 BP	AD 1030 to 1210		McCullough, per. communication 2005
	860 +/- 40 BP	AD 1040 to 1260	Beta-182348	McCullough et al. 2004
	850 +/- 70 BP	AD 1040 to 1280	Beta-180645	McCullough et al. 2004
	780 +/- 40 BP	AD 1190 to 1290		McCullough, per. communication 2005
Moffitt Farm (12H6/46)	980 +/- 80 BP	AD 960 to 1220	Beta-83334	Plunkett et al. 1995
	840 +/- 80 BP	AD 1030 to 1290	Beta-83333	Plunkett et al. 1995
	800 +/- 60 BP	AD 1150 to 1300	Beta-83332	Plunkett et al. 1995
	700 +/- 60 BP	AD 1220 to 1400	Beta-83337	Plunkett et al. 1995

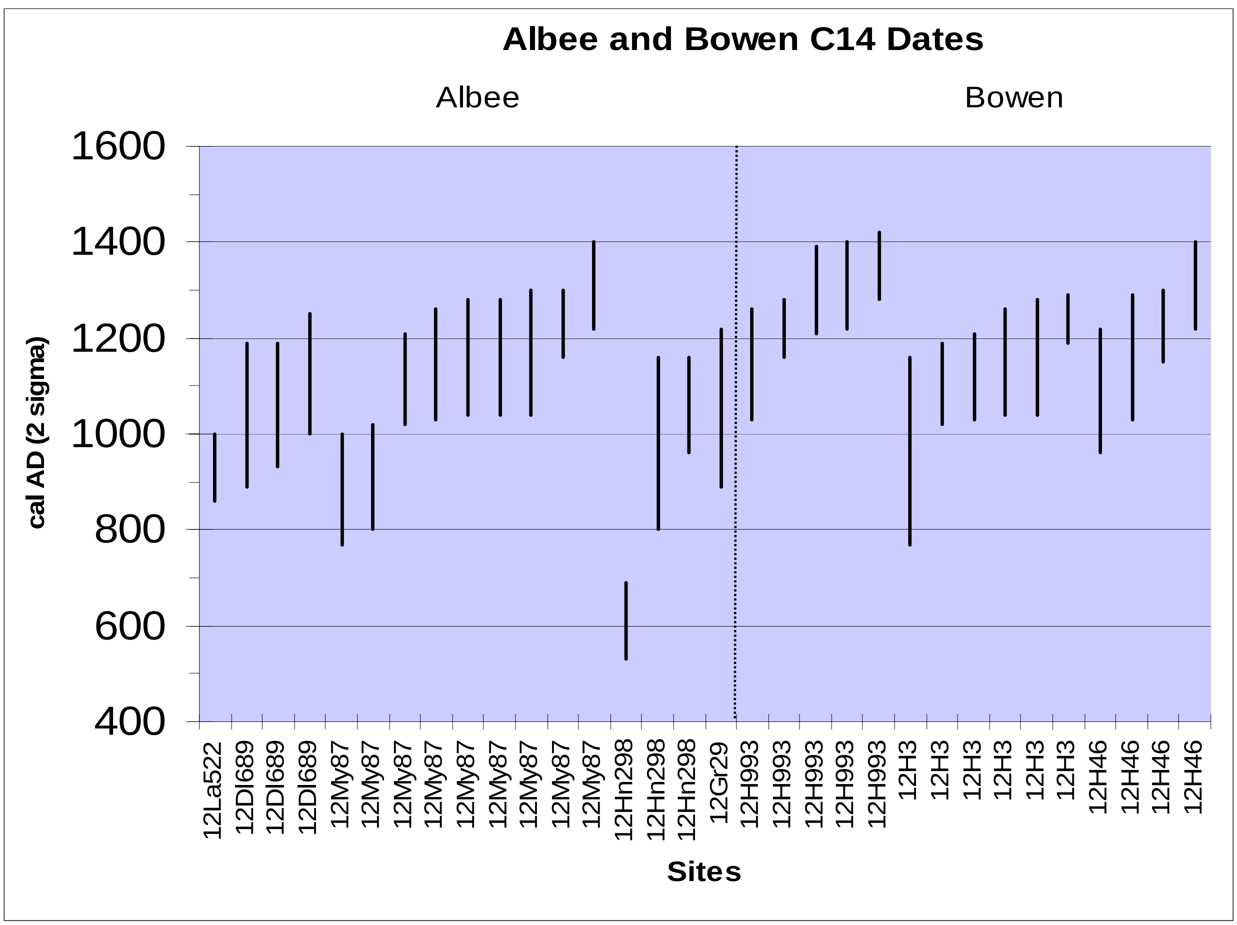

Figure 88. Albee and Bowen radiocarbon dates.

When examining the radiocarbon dates, the dates from Moffitt Farm (12H6/46) and Castor Farm (12H3) fit very well with 12-H-993. The Bowen series ceramics appear to date between cal AD 1000 and 1400. The radiocarbon dates are contemporary or overlap with both Albee Phase and Oliver Phase. It is clear with the radiocarbon evidence that Albee ceramics did not precede and evolve into the Bowen ceramics as we previously suggested (McCord and Cochran 2003a:122). Rather these ceramic traditions were contemporary for approximately 300 years between AD 1000 and 1300.

In relation to the Oliver Phase, the radiocarbon dates from 12-H-993 precede the time range given for the phase between AD 1200 and 1450 (McCullough 2004:28). While AD 1200 is reported for the beginning of the phase, numerous radiocarbon dates from Oliver Phase sites also precede AD 1200, encompassing the period between AD 900 and 1500 with most dates overlapping between AD 1000 and 1400 (McCullough et al. 2004:211). This creates a conundrum. Should these earlier sites be included with the Oliver Phase? Part of this problem is the over generalization of Oliver Phase ceramics included both Bowen series ceramics and Fort Ancient styles. There is growing evidence that several sites in at least the Upper White River drainage contain only the Bowen series ceramics without the presence of Fort Ancient styles (see Woodland Settlement section). Based on radiocarbon evidence and seriation of the ceramics (McCullough 2004 et al. 2004:188-210), it seems clear that the Bowen series ceramics were well established in the Upper White River drainage prior to any Fort Ancient influences. The derivation of these ceramics does not appear to be Springswells Phase of the Western Basin origin, since the Springswells Phase dates between AD 1200 and 1300. The ceramics could be associated with the Younge Phase of the Western Basin, which dates between AD 1000 and 1200, but there is no evidence that this population dispersed (eg. Stothers and Schneider 2003). Currently, it appears that an established population utilizing Bowen ceramics was in central Indiana by AD 1000. Fort Ancient influences, if they are derived from Middle Fort Ancient Anderson styles, did not appear in the area until AD 1200. Bowen and Fort Ancient decorative styles do not appear on the same vessel until after the mid 1300s (McCullough et al. 2004:205). Radiocarbon dates suggest that the Bowen series ceramics (Great Lakes Impressed style) were separate from the Oliver series ceramics (Fort Ancient style).

The relationship of site 12-H-993 with the Albee Phase and Oliver Phase will be expanded in the Section 5.0.

4.4 Summary

Thirteen features were recorded during the excavation of 12-H-993 and nine of the features were excavated. The eight cultural features that were excavated appeared to represent three feature types: deep pits, a shallow pit, and earth ovens. The features had been filled with midden deposits containing lithics, pottery, faunal and floral materials. The features and their contents were compared with regional Late Woodland/Prehistoric archaeological units.

The dates from 12-H-993 range between cal AD 1030 and 1420 and overlap during the period of cal AD 1160 and 1400. In comparison with other central Indiana Late Woodland/Prehistoric manifestations, these radiocarbon dates fall within Oliver Phase, cal AD 1200 to 1450, and the Albee Phase, cal AD 800 to 1300. In relation to the Oliver Phase, the radiocarbon dates from 12-H-993 precede the time range given for the phase between AD 1200 and 1450 (McCullough 2004:28).

The lithic artifacts indicate a reliance on local materials for chipped stone tool manufacture, but a few exotic sources show connections with the western and southern areas of Indiana. The locally available quartzite appears to be associated with the Bowen series ceramics. Triangular points recovered from the site fall into an early and middle range (prior to AD 1000 through AD 1300) based on a proposed classification scheme using hafting attributes. The disproportionate amount of flakes to cores and bifaces suggests the midden deposits were somewhat specialized rather than representing a generalized deposit.

The majority of the pottery recovered was identified as part of the Bowen ceramic series (Dorwin 1971). Two, possibly three, vessels were related to Albee Cordmarked or Albee Phase ceramics. The occurrence of both Albee and Bowen ceramics at 12-H-993 may indicate a prior Albee presence at the site or a contemporary relationship where both ceramic populations utilized the area, but in different ways.

Very few bone artifacts or bone tools were recovered in the assemblage. The bone tools that were recovered were common in broader Late Woodland artifact assemblages.

The majority of the identifiable faunal assemblage was comprised of white-tailed deer. Elk occurred in the assemblage but in a much smaller quantity. The occupants also occasionally consumed fish, mussels, and small and medium mammals. The animals were all locally available and thrive in the region. None of the animals identified were exotic. When compared to Oliver and Albee Phase sites, the faunal material from site 12-H-993 was not significantly different. Based on the current sample, Oliver and Albee Phase faunal exploitation shows little variation.

Corn at site 12-H-993 was ubiquitous and moderately abundant. Evidence for other crops of maygrass and domestic chenopodium was scarce. Nutshell was also scarce, but other wild plant remains were common. The floral remains reflect exploitation of local resources, including floodplain and upland forests, edge species, and prairie. The midden filled features showed little variability, but some had greater densities of macrobotanical remains than others.

Site 12-H-993 predates the existence of the Oliver Phase by approximately 200 radiocarbon years. Currently, it appears that an established population utilizing Bowen ceramics was in central Indiana by AD 1000. This population was part of a widespread Late Woodland tradition in the Midwest that had commonalities in artifact assemblages and subsistence practices. This site is regionally distinctive from the generalized pattern based primarily on the Bowen series ceramics. The feature structure also suggested that this site served a special communal purpose in a broader settlement system.

4.5 Conclusions and Recommendations

The information obtained during the limited testing of site 12-H-993 has added significant information on Late Woodland/Prehistoric settlement in central Indiana. The surface collections from the site revealed only a small percentage of what the sub-plowzone feature deposits contained. The use of the gradiometer survey greatly enhanced the identification of cultural features, although it did not identify every feature that was encountered. The excavated features added a wealth of data on Late Woodland/Prehistoric artifact assemblages, subsistence patterns and settlement.

The limited testing was conducted an area approximately 1.25 acres in size. This area represents less than 3% of the total site area. From the information already obtained, site 12-H-993 is considered eligible for listing on the State and National Registers of Historic Places. Further testing or mitigation is recommended if the site cannot be avoided by future construction and development projects within Koteewi Park.

5.0 DISCUSSION

This project resulted in the recovery of some anticipated and unexpected information. The goal of the project was to enhance the definition of the Albee Phase in terms of chronology, settlement and culture process from a regional perspective. While this goal was attained, it was with limited success. Due to the nature of the data collected from 12-H-993, the Oliver Phase was also explored. Current perceptions of the nature of the Albee and Oliver phases are reviewed and suggestions for future research are proposed.

5.1 Identifying Albee

The Albee Phase is an ill defined archaeological unit and the lack of a clear understanding of this manifestation inspired the current research project. The main purpose of this project was to deconstruct and redefine the Albee Phase. We constructed the enterprise to review data that had been previously collected, acquire additional survey data from the Upper White River drainage in Hamilton County, and conduct limited testing of site 12-H-993 that had an Albee component. We had anticipated investigating Albee Phase chronology, diagnostic artifacts, settlement, and relationships to other central Indiana archaeological units. We defined six research questions to guide the research:

1. What are the chronological limits of the Albee Phase in the Upper White River drainage?
2. What are the diagnostic artifacts of the Albee Phase in the Upper White River drainage?
3. Is there diachronic variation in the material culture of the Albee Phase?
4. What is the Albee Phase settlement pattern in the Upper White River drainage?
5. What is the relationship of the Albee Phase to other archaeological units?
6. Is there definable variation between the Albee Phase in the Upper White River drainage and other regions?

The data we recovered during this project was disappointing in relation to the research goals and questions we had set. While the archaeological survey documented 40 new and 8 previously recorded sites and recovered over 1200 artifacts with diagnostic artifacts ranging in age from the Middle/Late Archaic (3700 BC) to the Historic (late 20th century) period, we documented no definitive Albee Phase habitations. The White River floodplain was dominated by Late Woodland/Prehistoric occupations, but diagnostic Albee pottery was not recovered. The test excavations at site 12-H-993 provided a wealth of information on the Late Woodland/Prehistoric era from the features and artifacts recovered, but only a few of the artifacts could be related to the Albee Phase.

In spite of the paucity of new information concerning the Albee Phase derived from the survey and testing portion of this project, important information was obtained by reviewing previous collections and previous documentary sources. This information provided enough information to address the research questions, at least in a limited sense.

Our understanding of the Albee Phase will only progress as more data is obtained, particularly from excavated contexts.

5.1.1 Albee Background

The Albee Complex was first recognized and defined by Howard Winters (1967) from survey data in the Wabash Valley in Illinois and Indiana. The trait list of artifacts and the type description for Albee Cordmarked ceramics was based on artifacts recovered from the surface of four multicomponent sites in Illinois (Chenoweth and Murphy 1, 2 and 3); an amateur excavation of the multicomponent Catlin site in Indiana; and two multicomponent cemeteries in Indiana, Albee Mound and Shaffer cemetery (Winters 1967). The only distinctive artifact in the complex was a cordmarked, grit-tempered jar with a wedge-shape rim. All the other artifacts associated with the complex were also present in other Late Woodland assemblages. Following Winters' (1967) definition, the Albee Complex became an accepted term for identifying Late Woodland artifacts and sites, particularly in the Wabash Valley.

Halsey (1976) expanded the Albee Complex to the Albee Phase and included it as part of the early Late Woodland Wayne Mortuary Complex of the Eastern Woodlands. Halsey (1976) identified two phases of the Wayne Mortuary Complex in Indiana: the Walkerton Phase in northern Indiana and the Albee Phase across the remainder of the state. The Walkerton Phase was never adopted in common usage and sites in northwestern Indiana are considered Albee.

In 1990, Anslinger (1990) updated the listing of excavated cemeteries and habitation sites with Albee components in Indiana. Albee was recognized as a manifestation relying primarily on information from cemetery sites with little data on habitations (Anslinger 1990:45, Tomak 1970). In 1992, the excavation of the Morell-Sheets site provided the first opportunity to recover contextual information from a virtually unmixed Albee Phase component(s) habitation (McCord and Cochran 1994). The Morell-Sheets site provided specific data on Albee Phase chronology, ceramics, lithics, and floral and faunal exploitation. Information from the site inspired a reevaluation of the definition of the Albee Phase (Havill et al. 2003, McCord and Cochran 2003b, Schurr 2003, White 1998).

5.1.2 Problems

After 30 years of research, the Albee Phase remains an Indiana/Illinois variation of a generalized Late Woodland artifact assemblage that occurred throughout the Eastern Woodlands. Although numerous sites are associated with the Albee Phase, it is a poorly defined manifestation (Anslinger 1990, Schurr 2003). Most of the information available on the Albee Phase comes from mortuary sites, mixed multicomponent habitations, and surface collections. Although the Albee Phase is an accepted and common archaeological unit in Indiana overviews (Kellar 1983, Swartz 1981, Redmond and McCullough 2000), the definition is largely untested with data from excavated habitation sites of unmixed context. While Morell-Sheets provided excellent data, one habitation site cannot represent the entire geographic distribution or settlement system of the Albee Phase. There are numerous problems in defining regional variation, artifacts that define the phase, internal chronology, settlement patterns, and relationships to other archaeological units.

5.1.2.1 Geographic Extent

As currently used in the archaeological literature, the Albee Phase is documented across most of Indiana and eastern Illinois (Winters 1967, Halsey 1976, McCord and Cochran 1994, Schurr 2003). During this project, the geographic extent of reported Albee Phase sites in Indiana was explored using previously published sources, site records on file at DHPA and a review of some existing collections.

Winters' (1967) original definition placed the Albee Complex within the Upper Central Wabash Valley from sites in Clark County, Illinois and Vermillion, Sullivan and Greene counties in Indiana. Halsey's (1976) mortuary sites added to Winters' Albee distribution by including sites from Lawrence, Henry and Blackford counties and placed the Walkerton Phase in Laporte, Porter and Allen counties. Other researchers broadened the Albee Phase across central Indiana counties (Anslinger 1990; Crouch et al 1977, McCord and Cochran 1994, 2003; McCullough 2000), northwestern Indiana counties (Faulkner 1961, 1972; Schurr 2003) and further south in southwestern Indiana (Higginbotham 1983). Archaeologists working in the state have identified 101 archaeological sites associated with the Albee Phase primarily from the western counties extending from Posey to Lake County and outlying eastern counties of Whitley, Blackford and Henry (DHPA database).

To determine if the Albee Phase should actually be considered as covering most of Indiana, published sources and the site forms on file at DHPA were reviewed to establish the criteria for defining an Albee Phase occupation. The information obtained varied greatly. In some instances, it was clear that the presence of wedge-shaped collared, decorated rim sherds were the defining characteristic; in others it was based on the presence of Jack's Reef Corner-Notched points; and in others it was unclear what criteria was used.

In an attempt to refine the distribution of the Albee Phase, only ceramics reported as diagnostic of the Albee Phase were used. This became the sole criteria used to assign a site to the Albee Phase to examine the geographic extent. Figure 89 shows the resultant distribution of Albee sites across Indiana. This distribution is generalized and does include areas that lack reported Albee sites. For example, no Albee sites were reported for Benton County, but it lies between Warren and LaPorte counties where Albee sites have been reported. Appendix I provides a listing of 80 sites within Indiana that are reported to contain diagnostic Albee Phase ceramics. The appendix also includes sites that are reported to be Albee, but lack diagnostic ceramics.

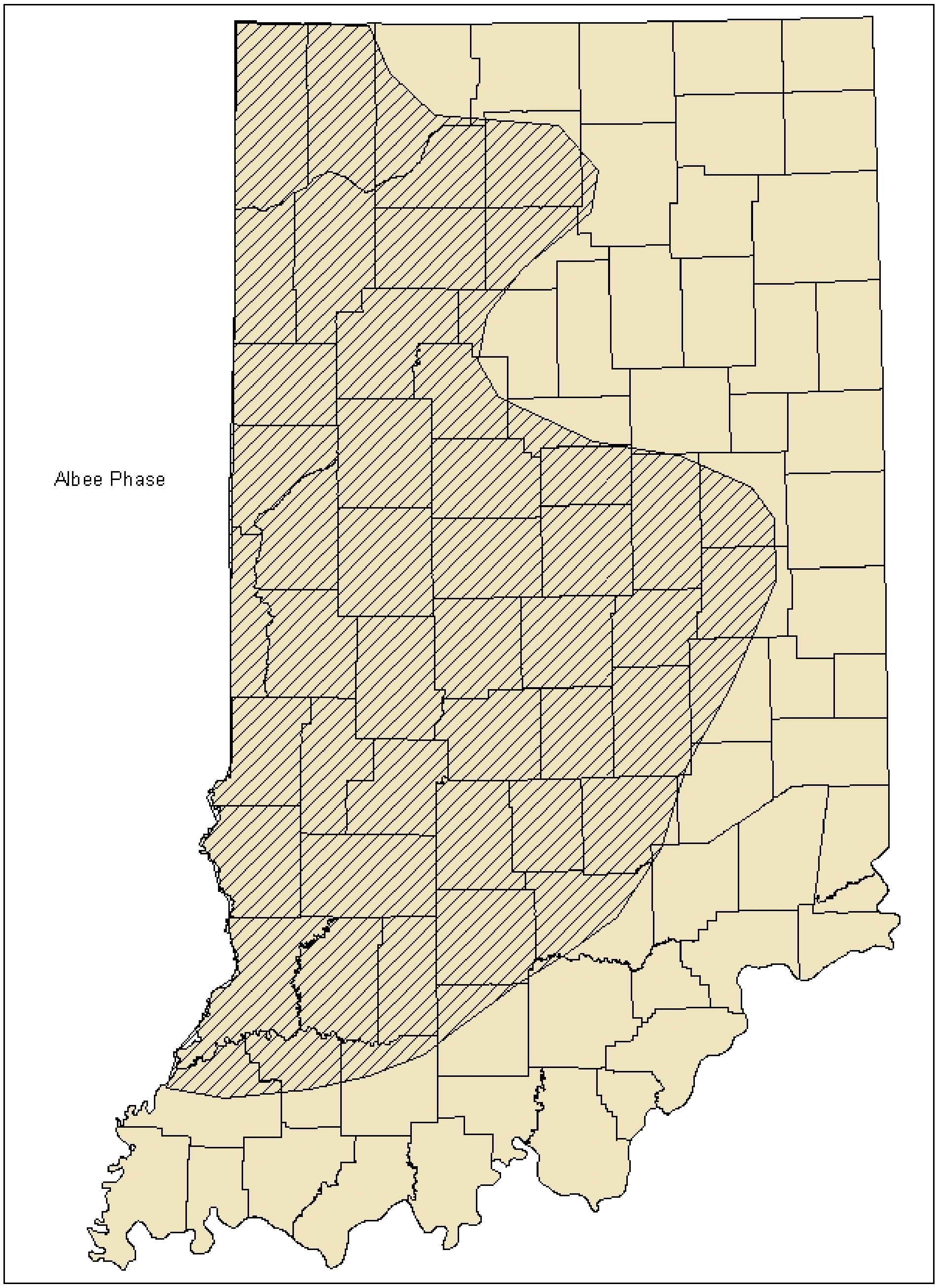

Figure 89. The Albee Phase distribution.

This effort to refine the distribution of the Albee Phase, did not meet with much success. We anticipated that by using only ceramics, the distribution would be more restricted. With the Albee Phase having such a broad distribution, cross-cutting diverse environmental settings, it causes problems in defining the archaeological unit. Variation in the material culture from different regions has been previously recognized (Halsey 1976, Havill et al. 2003, Schurr 2003, McCord and Cochran 2003b). Since artifacts tend to define archaeological units, an examination of Albee Phase artifacts was undertaken.

5.1.2.2 Artifacts

The artifact assemblages reported from Albee Phase sites have numerous commonalities with Late Woodland sites that occur throughout the Eastern Woodlands. Artifacts associated with the Albee Phase included shell beads, copper beads, slate gorgets, copper gorgets, bone awls, antler drifts, antler arrow points, bone whistles or flutes, antler or bone hooks, antler harpoons, bone needles, bone beamers, modified deer phalanges, modified animal jaws, raccoon bacula tools, modified turtle carapace, gravers, perforators, lamellar blades, endscrapers, chipped stone adzes, bipolar cores, ceramic pipes, straight base platform pipes and sandstone abraders (Winters 1967:60, 68 - 69, Tomak 1970, Halsey 1976:559-582, Kellar 1983:50, Cochran et al. 1988:48-65, Anslinger 1990:51, McCord and Cochran 1994:9-12). Artifacts that are of questionable Albee affiliation include copper beads and lamellar blades. These artifacts have not been found in direct association with diagnostic Albee artifacts (MacClean 1931, Black 1933, Kellar 1975). Antler harpoons listed in Albee assemblages (Halsey 1976, Kellar 1983) appear to be restricted to northern sites.

Winters (1967:68) documented diagnostic lithics artifacts that are now recognized as Triangular Cluster points consisting of types such as Madison, Levanna, and Hamilton and the Jack's Reef Cluster points consisting of Jack's Reef Corner Notched and Raccoon Notched types (Justice 1987). Triangular Cluster points have a wide geographic range throughout the eastern United States and some types are dated as early as AD 500 (Justice 1987:224-229). They are a general Late Woodland/Mississippian form and represent numerous cultural phases (Justice 1987:224). Jack’s Reef Cluster points date between AD 500 and 905 +/- 250. They are considered diagnostic of the Albee Phase in Indiana and Illinois and of the Intrusive Mound culture in Ohio. They are also distributed throughout the Northeast and Midwest (Justice 1987:217). An intensive review of Albee assemblages raised the question of whether Jack’s Reef Cluster points were in fact diagnostic of the Albee Phase (McCord and Cochran 2003b). Most of the identified Albee Phase sites with associated Jack’s Reef Cluster points were from surface collections and multicomponent sites (e.g. Tomak 1970). No Jack’s Reef points have been found in clear context with Albee Phase ceramics, the most definitive artifact of the Albee Phase. The preponderance of current evidence indicates that only Triangular Cluster points are associated with the Albee Phase (McCord and Cochran 2003b).

Albee Cordmarked ceramics are the most distinctive artifacts of the Albee Phase (Winters 1967). In fact, the ceramics are the only truly diagnostic artifact of the Albee Phase since all the other artifacts in Albee assemblages also occur in other Late

Woodland assemblages. Winters' (1967:88) outlined a type description for Albee Cordmarked ceramics that incorporated grit or sand tempering; cordmarked surface treatments; slightly elongated or globular jars; folded, wedge-shaped or cambered rims with flat or rounded lips; and decoration was rare consisting of short, vertical or diagonal plain or cordwrapped stick impressions on the interior of the lip. In the 30 years following the definition of Albee Cordmarked ceramics, additional attributes and variability were associated with the Albee Cordmarked type without revising or correcting the original type description (Anslinger 1990:47).

Several problems with Winters' (1967) type description and archaeological literature have been recognized (Anslinger 1990:47-51, McCord and Cochran 1994). The collections used for the Albee Cordmarked type description were based on artifacts recovered from the surface of four multicomponent sites in Illinois (Chenoweth and Murphy 1, 2 and 3); an amateur excavation of the multicomponent Catlin site in Indiana; and two multicomponent cemeteries in Indiana, Albee Mound and Shaffer cemetery (Winters 1967). The two cemeteries provided the only complete vessels. The Albee Mound excavation recovered five pottery vessels (MacLean 1931). Only two of the vessels were described and depicted as having well defined collars, one of which was a miniature vessel (MacLean 1931:124, 170-171). One of the vessels could be collared, but the vessel has a plain surface treatment, not cord or fabric marked (MacLean 1931:124, 166-167). One vessel may have a slight collar and it was castellated (MacLean 1931:124, 162-163). The rim on the final vessel was not present. Two pottery vessels were recovered from the Shaffer site (Black 1933). Neither of these vessels displayed a wedge-shaped collar, but one of the vessels was decorated with tool impressions on the neck (Black 1933:271-273, 332-333). One of the sherds illustrated by Winters (1967:63) as Albee Cordmarked is an uncollared rim with punctuations even though uncollared forms are not noted in the type description.

Given the context and confusion arising from sites used in the original type description, it has been difficult for archaeologists to identify Albee Phase ceramics. In essence, the Albee Cordmarked type description was stretched to include Albee Phase ceramics without revising or correcting the original type description (Anslinger 1991:47). Until the excavation at Morell-Sheets, no comprehensive data set from a large assemblage was available to adequately address Albee Phase ceramics. Based on the Morell-Sheets assemblage and recognition of similar attributes in other ceramic collections (Anslinger 1990:47), revisions to the original type description for Albee Cordmarked ceramics were proposed (McCord and Cochran 2003b). Revisions recognized that tempering agents were predominately crushed granitic rock, but also included limestone, chert and grog. The paste was sometimes well mixed but in other examples it was almost unmixed. Revisions also included the frequency and variation of decoration. Winters (1967:88) stated that decoration on Albee Cordmarked ceramics were rare. However, 89% of the rims from Morell-Sheets were decorated. Decorations noted by Winters (1967:88) were located on the interior of the lip and consisted of vertical or diagonal, plain or cord-wrapped stick impressions. Cylindrical punctations and vertical incisions on the exterior neck of the vessel were also noted (Winters 1967:88). At Morell-Sheets and other sites, a variety of decorative techniques were documented including plain and cordwrapped tool impressions; incised vertical, diagonal and crosshatched lines; knot impressions and punctates. Decoration was most often placed on the interior of the lip but also occurred on the exterior of the neck, on the collar, on the lip, and on the interior of the neck. Horizontal cordmarking on the interior of the neck was also noted in nearly half of the assemblage from Morell-Sheets (McCord and Cochran 1994). The association between the uncollared sherds and radiocarbon dates from Morell-Sheets suggested that the uncollared forms appeared early in the temporal sequence and since decorative elements were consistent with collared forms, they were considered part of the Albee Cordmarked type (McCord and Cochran 1994).

While the revisions to the Albee Cordmarked type have been proposed, the revisions would unexpectedly broaden the type to becoming a catch-all for Late Woodland ceramics in Indiana. The main problem with the revision is the inclusion of uncollared rim forms as diagnostic of the Albee Phase. As part of this project, visits to Purdue University, Landmark Archaeological and Environmental Services, Inc., the Division of Historic Preservation and Archaeology and Conner Prairie were made to review ceramic collections. These visits served to determine what other archaeologists considered to be Albee ceramics. An examination of ceramics from site 12-F-410 investigated by Landmark (Plunkett and Wappenstein 1999), revealed grit tempered, cordmarked sherds that were uncollared or weakly collared and had cordwrapped tool impressions on the interior of the lip (Figure 90). While similar to Albee Phase ceramics, these ceramics are not Albee Cordmarked. If the Albee Cordmarked type is expanded to include uncollared forms, it is feared that the Albee Phase will be expanded even more broadly.

Figure 90. Pottery from 12-F-410.

As an impediment to excluding uncollared rim forms from the Albee Cordmarked type, the Albee Mound and Shaffer cemetery, two of the sites used to define the Albee complex, would be eliminated. The ceramic vessels recovered from these two sites do not represent cord or fabric marked, wedge-shaped collared forms. Excluding the Albee Mound, the name-sake of the Albee Phase, would create historical taxonomy problems. However, it is felt that restricting the use of Albee Cordmarked to the distinctive wedge-shaped collar will result in limiting the geographic extent of the Phase and potentially clarify relationships with other Late Woodland manifestations. The uncollared forms appear to occur early in the Albee Phase (McCord and Cochran 1994, White 1998). Perhaps a separate complex or subphase can be defined for the uncollared forms in the future. There does appear to be continuity between the uncollared and collared forms and uncollared forms may be considered Albee if they are found in association with the diagnostic wedge-shape collared forms that are often decorated.

Proposed revisions to Albee Phase artifact assemblages would restrict the use of lithic and ceramic artifacts. Triangular Cluster points should be the only point type recognized for the Albee Phase. However, an Albee Phase component cannot be identified based solely on triangular points, since they are a general Late Woodland/Mississippian form and represent numerous cultural phases. Only wedge-shaped collared vessels should be considered as diagnostic of the Albee Phase. These vessels should only have cord or fabric marked surface treatments. The vessels are often decorated utilizing a wide variety of tool and cord impressions including stamping, incising and punctations. The decoration was placed on the interior lip, crest of the collar or neck portion of the vessel. Horizontal cordmarking on the interior of the neck may also occur. These revisions will cause several sites with a long history of having an Albee Phase affiliation to be reclassified and would likely exclude sites reported as having diagnostic Albee ceramics (see Appendix I). Restricting the use of the lithic points and ceramics identified with the Albee Phase is the only way to delineate the Albee Phase from other Late Woodland manifestations. Restricting the artifacts included may impact the temporal placement and variation within the Albee Phase.

5.1.2.3 Chronology

Winters' (1967) originally suggested the Albee Phase ranged between AD 800 and 1000 or slightly later. More recently, the Albee Phase was reported to occur between cal AD 800 and 1300 based on radiocarbon dating (McCord and Cochran 2003b). This report of radiocarbon dates included sites, such as Cooke and Smith-Phelps, that were multicomponent. This report also included sites such as Commissary that contained only uncollared ceramic forms. The 500 year chronology of this phase complicates defining the Phase since diachronic variation has been recognized (eg. Redmond & McCullough 2000, McCullough 2000).

Based on internal variation in artifacts and mortuary practices (Halsey 1976, Cochran et al. 1988, McCord and Cochran 1994, White 1998, Havill et al. 2003, Schurr 2003), division of the Albee Phase into subphases or components has been suggested utilizing the reanalysis of the Albee Mound, Shaffer cemetery, Bucci Mound and Shephard cemetery (Havill et al. 2003, Schurr 2003, White 1998). An early Component I would contain Jack's Reef points and uncollared ceramics, while Component II would contain triangular points and collared rims (White 1998, Havill et al. 2003). While a definite chronology was not established for the two components, Component I was suggested to range between AD 700 and 900 and Component II between AD 1000 and 1200 (Havill et al. 2003:113). While these studies have merit, they are based soley on mortuary data and primarily without associated radiocarbon dates.

During this project, the radiocarbon data was reexamined for context with the diagnostic wedge-shaped collared rim forms. Only sites that had these wedge-shaped collared ceramics and dates from multicomponent sites with clear association to these ceramics were considered indicative of Albee Phase chronology (Table 59). Inclusion of only five sites did little to refine the chronology of the Albee Phase. The calibrated radiocarbon dates still range primarily between AD 800 and 1300 (Figure 88). While uncollared rim forms were reported to occur early in the temporal sequence based on a date of cal AD 800 to 1020 from Morell-Sheets (McCord and Cochran 1994), the midden filled pit which produced this date also contained wedge-shaped collared ceramics. The other early date from Morell-Sheets, cal AD 770 to 1000, was derived from charcoal in a midden deposit that also contained a collared rim sherd (Moore 1989, ARMS files Trench 5, Unit 1-2). A recent radiocarbon date from residue on a collared rim sherd also provided an early date of cal AD 860 to 1000 from site 12-La-522 (Robert McCullough, personal communication 2005). Uncollared forms did not apparently evolved into the collared forms, but were coeval. Many collared ceramic types known in the Great Lakes region have both collared and uncollared variants, with the uncollared forms appearing early in the sequence (Fitting 1968:24). Perhaps the uncollared vessels served a different function. The ceramic vessels at Albee Mound, Shaffer cemetery, Bucci mound and Commissary are uncollared or weakly collared. These vessels are also smaller than those collared jars recovered from habitation sites (McCord and Cochran 1994).

While some studies indicate a chronological difference in material considered associated with the Albee Phase, the available data from habitation contexts do not indicate such a clear distinction. Once again, defining the chronological limits of the Albee Phase depends on the criteria used. If sites such as the Albee Mound, Shaffer cemetery and Bucci mound are included in the Albee Phase, even though they lack the wedge-shaped collared ceramics, then they will appear different because they are different. Whether these mortuary sites are early in the Albee Phase or part of a different Late Woodland expression requires further investigation. Archaeological data recovered 70 years ago does not often contain the details of context needed to make these distinctions. At this point, it seems erroneous to divide the Albee Phase into separate components, based only on mortuary data. Defining the Albee Phase based on mortuary sites and multicomponent habitations created many of the current problems, and we should refrain from making the same error with the available information. Unfortunately, we are still left with a long Albee chronology ranging between cal AD 800 and 1300.

5.1.2.4 Settlement Patterns

Without the presence of ceramics, affiliation to Late Woodland/Prehistoric phases are not discernable. Unfortunately, linking ceramic and aceramic data to examine settlement patterns is nearly impossible to achieve. One general Late Woodland model characterized settlement as permanent and semi-permanent occupation sites, often with storage facilities, residential structures and associated mortuary areas occurring in both large and small river valleys as well as in the uplands (Munson 1988:8). The review of Woodland settlement in the Upper White River drainage discussed previously in this report shows an almost equal exploitation of all environmental zones during the Late Woodland/Prehistoric. Albee Phase ceramics were only recovered from valley settings. A previous interpretation of Albee settlement patterns indicated that the cemeteries and habitation sites are typically associated with the valleys of major drainages or adjacent to extensive tracts of marsh or wetlands (Anslinger 1990:51). It was thought that the Albee settlement in valleys or near extensive tracts of wetlands was a reflection of horticultural practices (McCord and Cochran 2003b). Planting sites on the valley floor are believed to be focal points for the populations during planting and harvesting and it is assumed they would exploit upland resources in smaller, more dispersed groups. Albee habitation and mortuary sites were apparently segregated with cemeteries occurring in upland or valley edge settings. However, human remains were recovered from the Demerly habitation site (12-C-44) within the area of occupation (Bergman-Bell n.d.). Unfortunately, data on settlement patterns are limited and likely represent only a component of a larger Albee Phase settlement system. Data necessary for constructing an Albee settlement system model is not available at this time.

5.1.2.5 Relationships to Other Archaeological Units

The relationship between the Albee Phase, its predecessors and successors is still not clearly recognized (Winters 1967, McCord and Cochran 1994 and 2003a, McCullough 2003, Schurr 2003). Winters (1967) thought Albee to be intrusive into Indiana from the Illinois Valley. A northwestern influence or intrusion is possible, since Albee Phase ceramics have been related to Michigan and Wisconsin wares (Faulkner 1972, McCord and Cochran 1994). While not demonstrated in the review of DHPA site records, Albee Phase ceramics occur in great frequency in private collections from northwestern Indiana (personal communications of Don Cochran, Robert McCullough and Mark Schurr) than in other parts of the state. The Albee Phase may also represent the adoption of widespread ideas from indigenous populations creating cultural change. As noted for the eastern prairies (Brown and Sasso 2001), long-term cultural integrity is becoming a favored positioned in contrast to over simplistic replacement models used to explain cultural change. In researching the same issue of the origin for the Kekoskee Phase (AD 800 to 1200) of southwestern Wisconsin, Salkin (2000:532) favored a gradual adoption of cultural traits by local Late Woodland populations over a migration model. Throughout the Great Lakes region, populations adopted the use of collars in ceramic vessel design (Emerson and Titelbaum 2000, Douglas 1976, Fitting 1968, Halsey 1976). The Albee Phase has been suggested to terminate with the appearance of Upper Mississippian populations in the northwestern part of the state (Winters 1967, Schurr

2003). However, this does not explain the disappearance of the Albee Phase in central and eastern Indiana. The Albee Phase was suggested to develop into the Oliver Phase in central Indiana (McCord and Cochran 2003b), but this is not the case since collared Albee Phase ceramics are contemporary with the Bowen series ceramics.

Defining the relationships between the Albee Phase and other archaeological units has implications for understanding the complex Late Woodland/Prehistoric sequence in Indiana. It is becoming clear that a unilineal evolutionary, normative model of cultural change cannot be applied to the Albee Phase or any other Late Woodland/Prehistoric archaeological manifestation. The problems of defining phases or complexes or other archaeological units in Indiana are not unique. In summarizing recent studies of the Late Woodland across the Midwest, McElrath et al. (2000:10) stated:

> The Late Woodland was a world of shifting centers and peripheries, a cultural landscape marked by a series of continuous population and uneven cultural developments … [that] witnessed an intermixing of agriculturists and hunter-gathers; areas with fairly sedentary, perhaps even fortified settlements abutting zones traversed by shifting populations; people using fixed communal mortuary facilities coexisting with others who practiced mortuary customs that are archaeologically invisible.

Clay (2002:165) also addresses the issue of defining Woodland cultures that have similar patterns across broad geographic areas and that tend to fragment under scrutiny into fluid groups of people. He recognizes the failure of regional stages based on culture-historical units to adequately address "cultural pluralism" (Clay 2002:166).

Since evolutionary models do not fit the relationship of the Albee Phase and other known Late Woodland/Prehistoric populations, other potential models were explored. Some researchers have used ethnographic accounts of different Native populations utilizing the same territory to create models that allow for the existence of two or more contemporary archaeological units in the same region (Douglas 1976, Fitting 1970, Holman and Kingsley 1996). Fitting (1970) recognized that the Chippewa, Miami-Potawatomi and Ottawa each had different patterns of land use and seasonal movement. This information was applied to a Great Lakes Late Woodland model of multiple and articulated settlement-subsistence strategies that were in operation simultaneously in the same region to explain the presence of different archaeological units (Fitting 1970). Using data of Ojibwa, Ottawa, and Potawatomi cooperation through territorial sharing in risk buffering, Holman and Kingsley (1996) suggested that this same pattern of territorial sharing occurred in early Late Woodland populations in Michigan.

Given the information currently known for the Albee Phase, it is hard to determine the relationship to other archaeological manifestations. The Albee Phase itself is difficult to define when combating archaeological taxonomy and typology. Defining the predecessors and successors is even more difficult. The cultural-historical models that explain regional development are too rigid to capture fluid Late Woodland cultures, and it appears impossible to identify what a culture would emulate before or after it was present when evolutionary trends are not in effect. Because the Albee Phase is part of a widespread Late Woodland tradition, it is difficult to define particular phases or cultures and establish boundaries given the extensive degree of interaction and borrowing of ideas that undoubtedly occurred (Anslinger 1990:51). The situation of the Albee Phase and its contemporaries defies generalizations except at a broad level and then they are too generalized to be of use for archaeologists. Overly generalizing the Albee Phase could also mask regional and chronological differences by focusing too intently on a few sites. At this time, recognition of the Albee Phase hinges on the presence of wedge-shaped collared ceramics. The nature of its relationship with other Late Woodland expressions is unknown other than that they were contemporary. Future work will have to explore how territories were exploited by different, contemporaneous archaeological groups.

5.1.3 Research Questions

Although limited new data was generated concerning the Albee Phase during this project, new insights were obtained by reviewing previous collections and previous documentary sources. The research questions will be addressed with regard to the background and problems of the Albee discussed above.

1. What are the chronological limits of the Albee Phase in the Upper White River drainage?

Based on radiocarbon dates from the Jarrett Site (12-Dl-689) and the Hesher cemetery (12-Hn-298) the Albee Phase was present in the Upper White River drainage between cal AD 800 and 1250. This range of dates is consistent with known range of cal AD 800 to 1300 reported for the phase. No new radiocarbon dates associated with the Albee Phase were obtained during this project.

2. What are the diagnostic artifacts of the Albee Phase in the Upper White River drainage?

The only diagnostic artifact of the Albee Phase is the wedge-shape collared, cord or fabric marked ceramics. The ceramics are typically decorated with tool or cord impressions occurring on the inner lip, crest of the collar or neck of the vessel. A wide variety of general Late Woodland artifacts also occur in Albee assemblages including Triangular points, antler arrow points, antler drifts, bone awls, bone hooks, modified turtle shell and shell beads. However, without the presence of the collared rims, sites such as the Commissary cemetery, can only be considered to resemble Albee.

3. Is there diachronic variation in the material culture of the Albee Phase?

No new information to suggest diachronic variation was obtained. The collared ceramics occur throughout the cal AD 800 to 1300 time span. Uncollared forms associated with Albee Cordmarked, but not diagnostic of the phase, may only occur early in the temporal sequence. No other artifact type or feature class appeared to be temporally sensitive.

4. What is the Albee Phase settlement pattern in the Upper White River drainage?

A review of Late Woodland and Albee Phase settlement confirmed that habitations with ceramics occur in valley settings. Aceramic sites for the Late Woodland/Prehistoric period occurred in equal distribution between till plain, floodplain and outwash terrace settings. No Albee Phase cemeteries are reported from the Upper White River drainage. Information on Albee Phase settlement in the Upper White River drainage is based on five sites, and is therefore limited.

5. What is the relationship of the Albee Phase to other archaeological units?

The relationship of the Albee Phase to other archaeological units at this point is obscure. From radiocarbon dates and the occurrence of Albee Phase ceramics with Bowen series ceramics, it is felt these two units were contemporary. The nature of the relationship is, however, not definable at this time.

6. Is there definable variation between the Albee Phase in the Upper White River drainage and other regions?

Currently, it depends upon what criteria are used to define the Albee Phase to determine if there is variation between different regions. If sites with only the wedge-shaped collared ceramics are used to define the Albee Phase, then variation appears limited.

Within the collared ceramics, decorative elements are consistent but there is a wide variety of tool and cord impressions reported (McCord and Cochran 1994). Ceramics examined from Delaware County (12-Dl-289) and Hamilton County (12-H-993) are consistent with ceramics from Montgomery County (12-My-87), Tippecanoe County (12-T-59) and Carroll County (12-C-44). The presence of horizontal cordmarking on the interior neck of vessels reported in approximately half of the assemblage from Morell-Sheets (12-My-87) has not been reported from vessels in the Upper White River drainage. Most of the rim sherds examined from this region do not contain large sherds with intact neck portions, so it is unknown if this is a sampling deficiency or perhaps an east-west regional variation.

Raw materials used in chipped stone tools were examined. From the Jarrett Site (12-Dl-289), the only excavated site with Albee Phase contexts in the Upper White River drainage, only local raw materials were documented (McCord 2001). From other areas when the information was available, Albee Phase populations tended to rely on the regionally available chert sources. For example, at Morell-Sheets (12-My-87) the majority of chipped stone tools were manufactured from the locally available Attica/Sugar Creek chert. A regional variation is only due to physically different geographic areas.

No confirmed Albee Phase mortuary sites have been documented in the Upper White River drainage, but variation in cemetery construction in other regions does apparently occur. The Akers Mound, 12-Wa-244, is an artificially constructed mound (Anslinger 1990), while the Hesher cemetery, 12-Hn-298, occurred in sandy/gravelly soils on the valley edge (Cochran et al 1988). If uncollared ceramics are included, then mortuary sites like the Albee Mound, 12-Su-1, were placed in natural knolls (White 1998). Interments may also vary between flexed, semi-flexed or extended inhumations, but this may be more influenced by multicomponent use rather than regional variation (White 1998).

Other possible regional variations are found in bone and stone artifacts, but these are not documented for the Upper White River drainage. Antler harpoons have only been reported from northern Albee sites (Halsry 1976, Kellar 1980). The only stone pipes reported are from eastern sites, Commissary (12-Hn-2) and Secrest-Reasoner (12-Bl-1). However, neither of these sites contain collared Albee ceramics, and may not represent Albee Phase useage.

Because, so few Albee Phase sites have been documented in the Upper White River drainage and excavation is so limited, it is difficult to compare this region with any other.

5.2 Identifying Oliver

Explorations of the Oliver Phase were not part of the goals of this project. However, the materials recovered from 12-H-993 necessitated a review of this phase. The Oliver Phase was initially recognized from sites in the Indianapolis area where surface collections contained a mixed assemblage of ceramics with suggested affinities to Fort Ancient, Oneota and Great Lakes Woodland wares (Dorwin 1971, Griffin 1966, Helmen 1950, McCullough 1991, 2000, Weer 1935). Determining the cultural relationship and interaction of these materially different populations has been a source of archaeological investigation for numerous decades. Currently, interpretations of the Oliver Phase rely on the migration of several cultural groups attracted to the White River drainage for its agricultural potential (McCullough 2000, McCullough et al. 2004). Middle Fort Ancient (AD 1200 to 1450) populations most closely related to the Anderson Phase are hypothesized to have migrated into the White River drainage carrying some, but not the full range, of Fort Ancient cultural practices (McCullough et al 2004:24). The other population is related to the Springwells Phase (AD 1200 to 1300) of the Western Basin tradition, based on Great Lakes impressed decorative styles. While the derivation of these two contrasting ceramic traditions is still contested, the co-occurrence of Oliver series (Helman 1950) (Fort Ancient style) and Bowen series (Dorwin 1970) (Great Lakes Impressed style) is considered the defining characteristic of the Oliver Phase (McCullough et al. 2004:33).

While the Oliver Phase seems to be defined based on the co-occurrence of the two ceramic traditions, there are a few excavated sites without the Fort Ancient ceramics; Moffitt Farm (12-H-6/46) and the nearby Castor Farm (12-H-3). Ten sites were identified from the Upper White River drainage as having only Bowen series ceramics during this project. The co-occurrence of the two ceramic styles may be influenced by geography. The Fort Ancient style pottery is recognized as less prevalent in ceramic assemblages at the northern end of the west fork of the White River and more prevalent in the south (White et al. 2002, McCullough et al. 2004). Of course, the southern sites are closer in proximity to the Fort Ancient Tradition of the Ohio Valley (McCullough et al. 2004:223). Assimilation processes are not considered to be part of the dynamic in the early or middle portions of the Oliver Phase, but are recognized as a possibility for the end of the Oliver Phase being absorbed into the Fort Ancient aggregation (McCullough et al. 2004:223). While this is a possibility, even when Fort Ancient and Bowen styles occur on the same vessel, the result is a Fort Ancient vessel shape often with guilloche designs with cord impression elements on a rim fold. Influences of Fort Ancient designs on Bowen series vessels are not readily apparent. If there is a "dominant" culture, it would appear Bowen had a larger influence on Fort Ancient.

In light of the growing evidence, both from excavated and surface collections, it would appear that the Bowen series ceramics are separate and independent of Fort Ancient styles in central Indiana. Radiocarbon dates from sites with only Bowen series ceramics date between approximately cal AD 1000 and 1400. From radiocarbon evidence and ceramic seriation, the Bowen series ceramics predate the Fort Ancient styles (McCullough et al. 2004), but were contemporary between AD 1200 and 1400. During a previous analysis of ceramics from 12-H-993, Cantin et al (2003:54) remarked that the ceramics looked pre-Oliver but the radiocarbon dates placed the site within the Oliver time frame.

5.3 Summary

While the data collected from the survey and excavation portion of this grant project provided little new information on the Albee Phase in the Upper White River drainage, information was collected from the review of previous collections and documentary sources. This information allowed for a presentation of problems in defining the Albee Phase in terms of geographic extent, artifacts, chronology, and relationships to other archaeological manifestations. The information allowed a limited response to the proposed research questions. In addition, data from 12-H-993 allowed for a brief review of the nature of the Oliver Phase.

The essence of the information collected for the Albee Phase recognizes it will continue to be a poorly understood and misused archaeological term until it is better defined. It is proposed that at least for now, the Albee Phase classification be restricted to the wedge-shaped collared ceramics. These vessels should only have cord or fabric marked surface treatments. They are often decorated utilizing a wide variety of tool and cord impressions including stamping, incising and punctations. The decoration is placed on the interior lip, crest of the collar or neck portion of the vessel. Horizontal cordmarking on the interior of the neck may also occur. Uncollared or weakly collared forms, if found in association with the collared ceramics may be considered Albee, but they should not be used to define this affiliation. While this restrictive useage of the

Albee Phase will create historical taxonomy problems with some sites, ie. the Albee Mound, this appears to be the only solution to clarify what the phase is at this time.

What is truly needed to further research and understand the Albee Phase, is more survey and excavation data. The Albee Phase has been termed “ephemeral” by several researchers (Bush 2004b, McCullough et al 2004), but this manifestation is not short-lived nor is it fleeting in the archaeological record. It is, however, poorly represented in the archaeological record. Because the Albee Phase fits within the widespread Late Woodland, but has regionally distinctive ceramics, it appears that this unit represents an adoption of the Late Woodland “package” (McElrath et al 2000:21) rather than a migration of a population. It also appears that the Albee Phase was utilizing the same territory that Bowen ceramic people were using, at least in central Indiana. How this territorial sharing was negotiated is an avenue for future research. Perhaps the two populations were using the territory in different ways, but floral and faunal analyses do not suggest a major difference in subsistence. Perhaps, the Albee Phase is more concentrated in northwestern Indiana, and only used central and eastern Indiana on an occasional basis. However, the Hesher cemetery, and perhaps, the Commissary and Secrest-Reasoner cemeteries if they are in fact Albee, argue for more than a cursory investment in these areas. Understanding the Albee Phase and its relationship to other Late Woodland/Prehistoric manifestations is key to understanding this period of Indiana prehistory. We had hoped that this project would generate a better understanding of the phase, but as is so often typical of archaeological research, it seems only more questions have been created.

Several researchers have struggled with the problem of whether the Oliver Phase represents unrecognized multicomponent occupations indicated by the two ceramic traditions (Bush 2004, Dorwin 1971, McCullough 1991). Several sites contain evidence that the Bowen series ceramics do occur in isolation, and cannot, therefore, be considered Oliver by its current usage of the co-occurrence of the two ceramic traditions. It is proposed that the Oliver Phase be redefined in a more restrictive manner. The Oliver Phase, similar to the Albee Phase, has become too inclusive in terms of ceramic traits. Since the Bowen series ceramics do occur with Fort Ancient styles, they should be recognized as a separate component, perhaps as the Bowen complex. The Oliver Phase should be restricted to the blending of Fort Ancient and Great Lakes Impressed styles after the mid 14th century. Undoubtedly there is a relationship between the makers of the Bowen series and Fort Ancient series ceramics, but by considering these initially separate groups together as the Oliver Phase masks their distinctiveness. There appears to be sufficient information for a revision of Oliver Phase taxonomy and nomenclature.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This project was designed to deconstruct and redefine the Albee Phase. We constructed the project to review data that had been previously collected, acquire additional survey data from the Upper White River drainage in Hamilton County, and conduct limited testing of site 12-H-993 that had an Albee component. We had anticipated investigating Albee Phase chronology, diagnostic artifacts, settlement, and relationships to other central Indiana archaeological units

The project was conducted within the Upper White River drainage basin, an area that changed and evolved over the last several thousand years. Settlement and use of resources would have also changed over time. Investigations of the Woodland settlement patterns showed variation in the utilization of landforms. Valley settings were important throughout the Woodland and Late Prehistoric periods, but the use of floodplains, outwash terraces and till plains varied by time and likely by culture. Albee, Bowen and Oliver ceramics occur either on floodplains or outwash terraces within the valley. Albee sites show a slightly higher tendency to utilize transitional areas of the floodplain/outwash terraces.

To investigate Albee Phase settlement further, approximately 195 acres of agricultural land were investigated by systematic field survey. The survey area covered 40 acres of outwash terrace and 155 acres of floodplain. The archaeological survey documented 40 new and eight previously recorded sites. Over 1200 prehistoric artifacts were recovered ranging in age from Middle/Late Archaic to Late Prehistoric. The results of the survey were similar to other surveys conducted within the Upper White River valley. From the combined data, we expect to find one prehistoric site per every 4 acres. The site sizes will range from isolated finds to larger sites of approximately 3 acres or to very large sites over 40 acres in size. The sites will most often be encountered on the higher elevations in the floodplain. Most of the prehistoric sites recorded in the Upper White River drainage are unidentified to time period. Late Woodland/Prehistoric artifacts are most common when diagnostic artifacts are recovered. Late Archaic, Middle Woodland and Early Archaic sites occur in lower frequency. Early Woodland sites are rare and Paleoindian sites have not been reported from the valley floor. While the goal was to identify Albee Phase sites, no definitive Albee pottery was recovered during this part of the project.

To further our understanding of Albee Phase chronology, material culture and settlement, limited test excavations at site 12-H-993 were conducted. Thirteen features were recorded by the project and nine were excavated. Eight of the features were cultural in origin and seven were pit features. The pit features were either earth ovens, deep pits or shallow pits. Each of the pit features had been filled with midden deposits containing lithics, pottery, faunal and floral materials.

The analyses of data from site 12-H-993 revealed that the site was occupied between cal AD 1030 and 1420. The occupation was probably seasonal in duration and reoccupation of the site numerous times was likely. The lithic artifacts showed a reliance on local materials, but a few exotic sources indicated small population movements either from the west and/or south. The locally available quartzite appears to be associated with the Bowen series ceramics. The ceramic assemblage was dominated by Bowen series ceramics, but a few Albee sherds were also recovered. The faunal material indicated a reliance on white-tailed deer supplemented with smaller amounts of fish, mussels and small and medium mammals. Floral remains contained moderate amounts of corn, with a few examples of maygrass and domestic chenopodium along with other wild plant remains.

The excavated features provided a wealth of data on Late Woodland/Prehistoric artifact assemblages, subsistence patterns and settlement. We were hoping for an Albee Phase occupation, but the data suggested an occupation related to Bowen series ceramics. Due to the nature of the data from site 12-H-993, the current perceptions of the Oliver Phase were reviewed. Site 12-H-993 cannot be considered an Oliver Phase site, because the Bowen series (Great Lakes Impressed) ceramics do not co-occur with Fort Ancient styles and the radiocarbon dates precede the Oliver Phase by 200 radiocarbon years. It appears that several sites, like 12-H-993, contain only Bowen series ceramics and no Fort Ancient styles. It is felt that the Oliver Phase has become too inclusive in terms of ceramics traits and needs redefinition.

The project resulted in the recovery of some anticipated and unexpected information. The goal of the project was to enhance our understanding of the Albee Phase. The goal was obtained but with limited success, since little new information on the Albee Phase was obtained. The Albee Phase will continue to be a poorly understood and misused archaeological term until it is better defined. To hopefully clarify what Albee is, it is proposed that only cord and fabric marked wedge-shaped collared ceramics that are frequently decorated are considered indicative of the Albee Phase. Future research should focus on obtaining excavation data from Albee Phase habitations. Until new data with reliable contexts is obtained, our understanding of the nature and relationship of Late Woodland/Prehistoric interactions will be limited.

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